RAILROAD GAZETTE

FRIDAY, FEBRUARY 15.

Contributions.

The Proposed Uniform Code of Signals.

TO THE EDITOR OF THE RAILROAD GAZETTE :

The report of the Committee of General Time Convention, submitting a uniform code of signals, is now before the railroad fraternity for c iticism and adoption, and, as allusion has recently been made in your columns to my former contributions on the subject, I may perhaps be pardoned for a few last words in behalf of a good work well begun, and which, I trust, will be pushed forward with that same energy and ultimate success which has so recently characterised the movement toward standard time. Uniformity is here the one thing desirable, necessarily obtainable only by concessions more or less mutual, and even if there be no mutuality, none the less desirable. Suppose the concessions asked are somewhat one-sided ; what then ? I take it we are chiefly interested in knowing whether the code proposed is the best one or not. Your own editorial comment and the ideas of your correspondent, "Fairness," are directly in point, and I can do little but reiterate them here. Whether the code be substantially that of the Pennsylvania, or Missouri Pacific, or of any other of our great railroads is immaterial, is it not, except so far as the general repute of these lines entitles their practice to a respectful consideration ?

Such a road as the Pennsylvania, by the acknowledged ability with which its system of administration has been elaborated and is now conducted, commands respect, and its various standards are everywhere the subjects of careful study by the officers of other lines ; and similarly the several roads which furnished the members of the committee have that standing among the railroad community which confers weight and a species of authority upon their practice.

But after having awarded the code that respectful consideration to which its origin of right entitles it, it should then stand squarely on its own merits, and all personal elements, which can only harm the movement by closing up the avenues of concession, should be scrupulously eliminated from the discussion. Suppose it were *verbatim et literatim* the Pennsylvania code, and recommended in their interests (which latter thing, however, I think, few will believe), if it is the best should it not be adopted notwithstanding ? Are not speculations as to the motives actuating those who framed or are supporting it entirely foreign to the real question, which is the making of it a standard for future use ? It certainly seems so to me. The only inquiry to my mind is, Is it the best, considering all the circumstances of the case and the objections which can be urged against it ?

Passing now to what can at best be but a hasty review of a few salient features of this code we can readily imagine that the committee at the outset were governed in their work by the consideration that, from the limited number of available motions of hand and lantern, blasts of whistle or taps of bell, the ones least liable to fail or be misunderstood in critical moments should be assigned to those signals the failure or misunderstanding of which would be the most disastrous.

Pre-eminently, then, should the stop or danger signal be given preference, and be the first one determined in all parts of the code. In the case of lantern signals there are practically but two stop signals in general use. None of the 35 roads tabulated by me in 1881, nor of the 25 more recently tabulated by the committee, use any others, these being (in the langurge of the committee) either a motion crosswise of the track or a motion up and down.

Two years ago I favored the latter signal, for reasons which I have not the space to review at present. (See *Railroad Gazette* Oct. 21, 1881. Your correspondent "Fairness," by the way, seems to be unaware of the statistical tables of hand, lamp, bell-cord and whistle signals published by me at that time, when suggesting this subject to the Superintendent's Association for action.) Whether I should now favor it is a question. I presume it is permitted to all men not completely given over to mulishness occasionally to modify the views once held by them, and I must say that my faith in this signal has been somewhat shaken. It is, of course, true that the motion crosswise accords well with the prevailing practice, and, moreover, your own editorial comment on the subject of naturalness of signals in the issue of Jan. 18 is not without force; and at best the entire code is largely arbitrary in its nature, and the refinements of natural analogies must not be pushed to unreasonable extremities. But your St. Louis correspondent, however, in the *Gazette* of Feb. 1, to my mind hits the nail exactly on the head. I think it was only a few weeks after the publication of my former contributions that I chanced to observe the rear brakeman extinguishing his lights by a short and quick up-and-down motion of the lantern, and this on a trunk line, where the same up-and-down motion had been the stop signal for years ; and the ease with which the lights went out made me wonder whether these same lanterns would prove as unreliable were they in the hand of an energetic and excited employé endeavoring, by a similar motion, to signal impending disaster to an approaching train. I would suggest a few simple experiments made personally with lighted lanterns to those operating officers who still pin their faith to this up-and-down danger signal. My present judgment is that its use involves danger—danger that the light go out where there is the most urgent need for it to continue burning, danger that the signalman shall at the critical moment be deprived of the means wherewith to signal his warning, a danger which it seems to me is greatly reduced, and possibly entirely removed, by the adoption of the crosswise motion. The question, therefore, seems to be, Can our roads afford to incur this element of danger for the sake of theoretical perfection. On looking at in a practical way, should not the natural analogies yield in this instance to prevailing practice, backed up by the old and reliable maxim, *safety first in all cases of doubt* ?

If any reasonable doubt exists as to the reliability of this particular signal, discard it at once, and adopt one concerning which there exists no such doubt, even at the expense of theoretical analogies. This is evidently a case where practice, as usual, steps in to modify our theories, and when it comes to pitting the chances of an employé trained in the old forgetting the new meaning assigned to the crosswise motion, against the chance of failure of the light itself when quickly moved up and down, I should myself prefer to trust to the intelligence of the average trainman rather than to the total depravity of the lantern. With this conclusion reached the stumbling-block is at once removed, the up-and-down motion becomes the go-ahead signal and its occasional failure merely causes slight delays instead of accident and disaster; and little objection, I take it, will be made to the remaining lantern signals of the proposed code. And it should not be forgotten that determining the lantern signals determines also the hand signals, for in the language of the Committee, "To avoid confusion the day or hand signals should be made so that it is possible to give the same motions at night with a lamp in the hand," or, in the language of my former articles, " we should seek for a close correspondence between the motions of the arm by day and the lantern by night." Thus the approval of the lantern code is *per se* an approval of the code of hand signals, the entire matter really turning upon the selection of the danger signal in the lantern code.

The few criticisms I have to make upon the remaining portions of the code I shall be obliged to reserve for your next issue.

EDWIN A. HILL.

NEW HAVEN, Feb. 12, 1884.

BOSTON, Mass., Feb. 11, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read the report and recommendations of the Committee on Uniformity of Signals, and believing that there is room for considerable discussion, I wish to say a few words in regard to it. In the first place, I do not understand why "hand and lamp signals should be as nearly as possible like the motions a person uninstructed would give to convey the same meaning." As far as stopping a train is concerned, any person not familiar with railroad rules or motions could do that by giving violent and energetic motions to the engineer or trainmen, but why should any outsider give a motion to "go ahead" or "back up?"

While it may be a question upon which trainmen will differ, as to whether the "up-and-down" motion of the lantern should be the "go ahead" motion, and the "swing in a circle" the "back up" motion, or *vice versa*, it seems to me that the "swing in a circle" or "swing in a half circle and back again" is the better motion for "go ahead," and the "up-and-down" motion for "back up," because as these signals govern passenger as well as freight trains, a lantern swung in a circle can be more readily seen and the motion understood in a crowded depot than when the "up-and-down" motion is given; again, the motion to "go ahead" is given much more frequently on a passenger train than the motion to "back up," and it should be as distinct as possible, so that an engineer may lose no time in starting away from a station. When an engineer starts to go ahead, he can see for himself where he is going, but when he is backing up he is obliged to let others see for him, and will necessarily use great caution; therefore it is not so essential that a "back up" motion be so plain and quickly seen as a "go ahead" motion. I think that a majority of trainmen would prefer the motions as given above, especially on freight trains, as I believe that they are the most *natural* ones that can be given, although I do not think of any other particular reason now, why one would not be just as good as another on a freight train unless it be that brakemen engaged on switching engines might say that it would be easier to give a continuous "up and down" motion to "back up" than a "swing in a circle" motion. Let me say here in answer to the article of "S. D. W," in your issue of Feb. 1 that an engineer should *use steam* in "backing up" only so long as he is getting a motion to do so, and there is little liability of an accident in case a lantern goes out if the brakemen do their duty and do not try to stop the train by "hollering."

If a trainman cannot make an "up and down" motion with a lantern without putting the light out, it would be well for him to "lay off a day and learn." Again, I have seen the bottom of a lantern "fly out" and go over in the field, once in a while, when being swung.

The committee further say, that "all signals should be so plain as to make it impossible to misunderstand or confuse them ;" also, that, "as far as possible no signal should be made to convey more than one meaning." Now are not the lantern motions recommended by them for "back up" and "train parted" in direct contradiction to the above propositions ? Who could tell the difference between these two motions twenty to forty car lengths away ? In actual practice, I think that there would be considerable misunderstanding if the men attempted to go by these motions. When a train has "broken in two" or "parted," why not give the "go ahead" motion to the engineer and the "stop" motion to the men on the hind end of the train ? Too many times it happens, on a road where there are many curves, that it is the engineer or fireman who first discovers that the train has "broken in two." On roads where there are long stretches of straight track, it might be advisable to have a distinct motion for train parted, but where there are curves, if the men on the hind end will attend to their duty, the men on the head end will most likely keep out of the way

I cannot agree with the committee that "to avoid confusion the day or hand signals should be made so that it is possible to give the same motion at night, with a lamp in the hand," because between the best practical motions to be given by either the hand or a lamp there may be as much difference as there is between darkness and light. In the day time a man can see the motion and the lay of the land and perhaps the cars themselves, but at night the man can only see the lamp, and a light is very deceptive, especially in unskilful hands. It would be better to adopt the plainest motions possible for night, regardless of whether they resemble the motions given by day or not.

I may, in a week or so, say something in regard to the other signals recommended by the Committee, but will close this letter by making one recommendation in regard to whistle signals, which is: Use four (4) whistles to call a flagman in from one direction and five (5) whistles to call him in from the other direction; then if it is necessary to call in one flagman and have the other one stay out, there is a rule to be governed by.

A.

The Apprenticeship System at the Brooks Locomotive Works.

The following circular, issued by the Brooks Locomotive Works, under date of Jan. 21, 1884, sufficiently explains itself:

"From and after Jan. 21 apprentices will be admitted to service in these works under the following rules, and no deviation will be made therefrom:

"An applicant must possess a good moral character; must be 18 years of age, with a fair knowledge of the ordinary English branches of education, and write a legible hand.

"Applications must be made to the office in writing and must be written by the applicant.

"An applicant must possess a natural aptitude for mechanics, and have a settled personal desire and purpose to become a skillful and competent workman.

"The term of service for apprentices will be three years.

"The compensation for the term will be: First year, 7½ cents per hour; second year, 9 cents per hour; third year, 11¼ cents per hour. Ten hours constitute one day's work.

"Apprentices will be required to attend the night school such evenings in the week as may be designated for such purpose. Tuition and books are furnished free of charge, and from the date above mentioned attendance in the night school will be obligatory upon all apprentices who enter our service thereafter.

"Neglect of this privilege will be considered cause for immediate dismissal from our service.

"This company cannot guarantee continuance of service during the full term of apprenticeship, as the ability to do this must be regulated by the conditions of their business, but they will do the best possible for their apprentices."

The following additional circular further expresses the company's intentions:

"It is the intention of this company to institute a high standard of excellence among their apprentices.

"*First*, by refusing all unfit applications, and

"*Second*, by using special endeavors to offer them every advantage to become not only skillful and competent workmen, but also to educate them in the principles underlying mechanical construction, and afford them opportunities to study and practice elementary mechanical drawing. Hence no applicant will be accepted until a full investigation of his character and elementary education is made.

"An applicant must be 18 years of age; must make application in his own handwriting through the mail addressed to our office, and must be prepared to furnish credentials of his character, education and aptitude for mechanical pursuits.

"Applications proving satisfactory upon investigation will be placed on file in the order of their application, and accepted applicants will be advised when their services are required."

Compound Locomotive, London & Northwestern Railway.

We illustrate in our present number one of a class of engines lately built by the principal English railroad company at the works at Crewe. The Mechanical Engineer, Mr. F. W. Webb, had previously designed and built a somewhat similar compound engine, the "Experiment ;" and the results obtained were sufficiently satisfactory to induce a further trial of the compound principle as applied to locomotives. The size of the high-pressure cylinders was increased from 11½ in. to 18 in. diameter, the diameter and stroke of the low-pressure cylinder being left unaltered, the exhaust ports being, however, increased in area, measuring 16 in. by 2 in., instead of 14 in. by 1½ in., in order to give more freedom for the exhaust.

As will be noticed, the compounding is effected in a peculiar manner ; the two outside high-pressure cylinders act on the hind drivers, while the one inside low-pressure cylinder acts on a single-throw cranked axle. No coupling rods are used, the idea being that as the exhaust from the high-pressure cylinders is bound to move the low-pressure piston, coupling-rods to compel an exact mechanical simultaneous movement are unnecessary. The coupling is really effected by the exhaust steam on its way to the low-pressure cylinder. If the front drivers slip, a large demand is made upon the exhaust steam, and its pressure is rapidly lowered until it ceases to be enough to cause the wheels to slip. Similarly, if the hind drivers slip, the back pressure of the exhaust to the low-pressure cylinder is so much increased by the more rapid

movement of the pistons that the net effective pressure on the high-pressure pistons is diminished until the tendency to slip ceases.

We are indebted to *Engineering* for illustrations and description of this engine, some particulars of which have already appeared in the *Railroad Gazette* of Aug. 17, 1883. An illustration and description of an earlier and smaller engine of this type, the "Experiment," were given in our number for March 31, 1882.

The two main objects in view in designing the "Experiment" were—firstly, to attain to greater economy in consumption of fuel; and secondly, to do away with coupling rods while at the same time obtaining a greater weight for adhesion than would be possible on only one pair of driving wheels without rapid destruction of the road. The driving wheels being no longer coupled, there is less grinding action in passing round curves, and it is not even necessary that one pair should be of the same diameter as the other.

The engine "Experiment" has now been at work over twelve months and run nearly 100,000 miles, chiefly with the Scotch and Irish limited mails. The engine has throughout proved itself to be very steady when running, which is no doubt due to the arrangement of the cylinders; the engine being practically balanced, and having no coupling rods, is enabled to run at very high speeds.

The construction will be readily understood from the following description and from the figs. 1 to 5. Of these, fig. 1 is a section through the low-pressure cylinder, fig. 2 through one of the high-pressure cylinders, fig. 3 is a plan, and figs. 4 and 5 transverse sections. There are two outside high-pressure cylinders 13 in. in diameter, figs. 2 and 3, and one inside low-pressure cylinder 26 in. in diameter, figs. 1 and 3, the stroke in each case being the same, namely, 24 in. The two high-pressure cylinders have their steam chests placed underneath in order to allow the valves to fall from their faces so that there is no wear when the steam is shut off. These two cylinders are attached to the outside frame plates immediately under the footplate, about midway between the leading and middle wheels, and are connected through their piston rods and connecting rods to the trailing wheels. The low-pressure cylinder, which has its

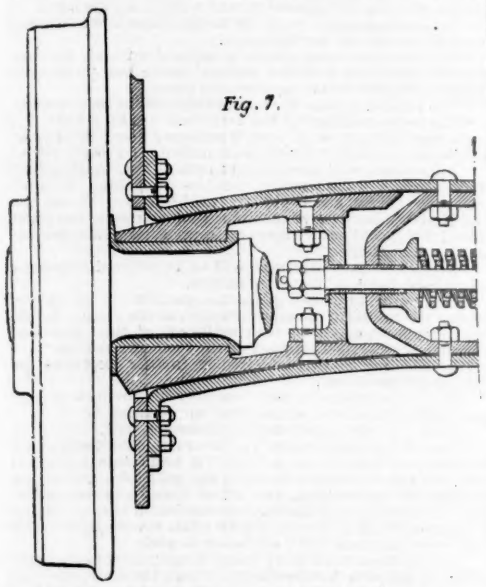


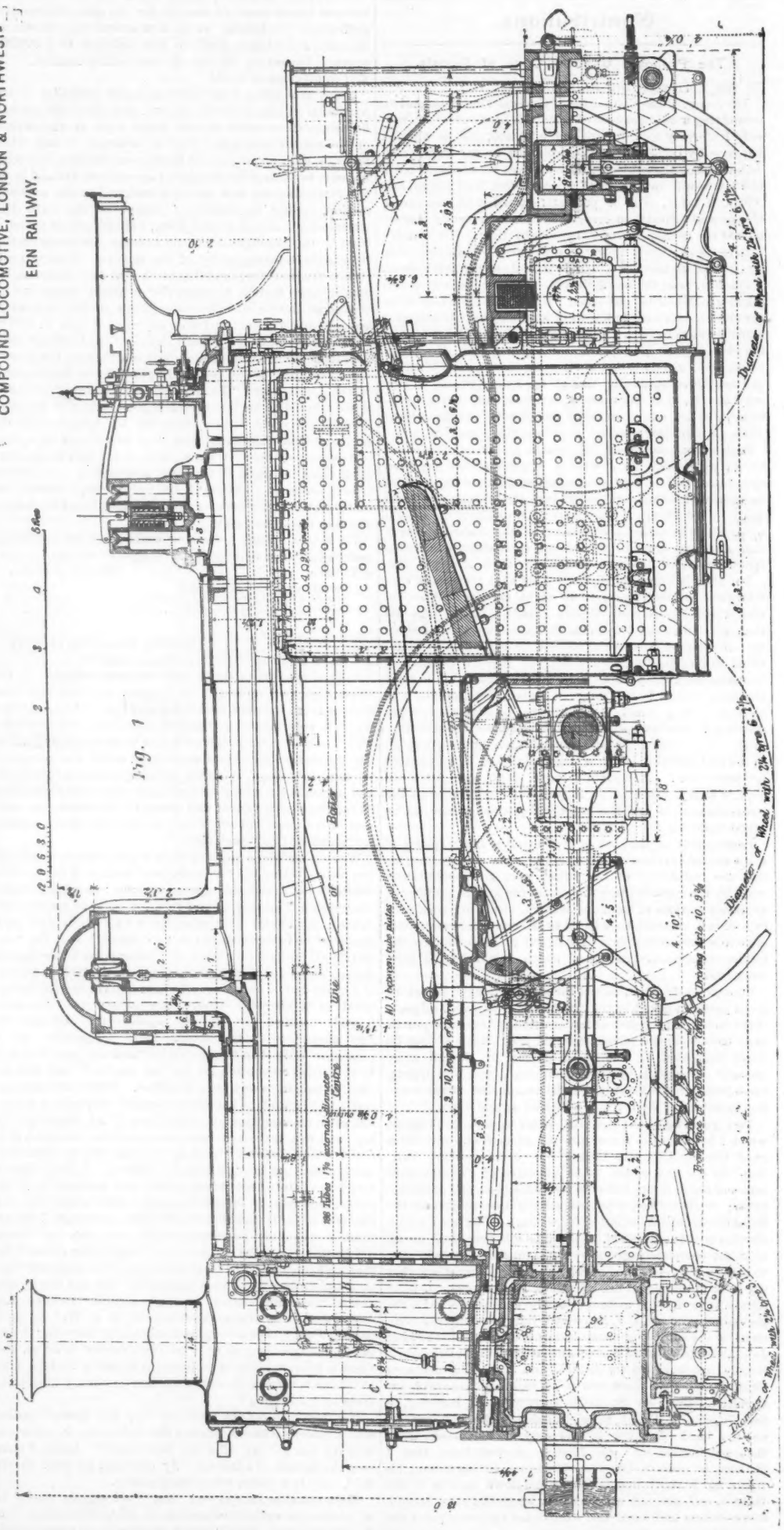
Fig. 7.

steam chest on the top, is placed directly over the leading axle and is carried between two cross steel plates, one at either end, securely fixed between the main frames. Its connecting rod lays hold of a single throw crank on the axle of the middle pair of wheels.

The steam is supplied through the regulator in the dome *A*, fig. 1. to a brass T pipe on the smoke-box tube-plate, and thence by two 3-in. copper steam pipes *B*, first running parallel to the tube-plate, then through the back plate that carries the low-pressure cylinder, and between the plates of the inside and outside frames, to the steam-chest of the high-pressure cylinders. The exhaust steam from these cylinders is returned by two 4-in. pipes *C*, running parallel with the high-pressure pipes, through the back plate that carries the low-pressure cylinder, and into the smoke-box; following round the curved sides of the smoke-box nearly to the top, each pipe passes across the opposite side, and enters the steam-chest of the low-pressure cylinder through passages in the cover. Thus the exhaust steam becomes superheated in these pipes by the waste gases in the smoke box, while the large capacity of the pipes themselves obviates the necessity for a separate steam receiver. The final exhaust escapes from each side of the steam-chest of the low-pressure cylinder into the blast-pipe, and thence to the chimney in the usual way, the only difference being that there are only half the number of blasts for urging the fire compared with an ordinary engine; yet the compound engine steams very freely, and has a blast-pipe 4⅞ in. in diameter for the final exhaust, compared with 4½ in. in engines of the ordinary type.

The steam-chest cover of the large cylinder is provided with a relief valve *D*, so adjusted that the pressure admitted may never exceed 75 lbs. per square inch; and a small pipe which is connected to the low-pressure steam-pipe, and carried back to a gauge fixed inside the cab, shows at a glance the actual pressure of steam being used in the large cylinder. Arrangement is also made whereby steam direct from the boiler can be admitted to the low-pressure cylinder, which is useful for warming up before starting.

The valve motion adopted for this engine is that designed by Mr. David Joy, which does away with all eccentric rods, and considerably reduces the number of working parts per



cylinder, as well as the weight of the valve gear. The total number of working or moving parts for the three sets of valve motion in the compound engine is 29, and their total weight 284 lbs.; while the number of working parts in the two sets of valve motion in the ordinary standard engine is 24, and their weight 798 lbs., the reversing shafts in each case not being taken into consideration. This is, however, hardly a fair comparison, as the reversing shaft requires to be made of greater strength and weight in Joy's motion in order to stand the additional strains put upon it by the sliding block.

The valve-chest being on the underside of the high-pressure cylinders, the motion disks *E* (see fig. 2) carrying the quadrant bars have to be placed in a corresponding position and this is done by securing them to the underside of the slide-bars. The quadrant bars, which are made of soft steel case-hardened, are each grooved to a radius equal to the

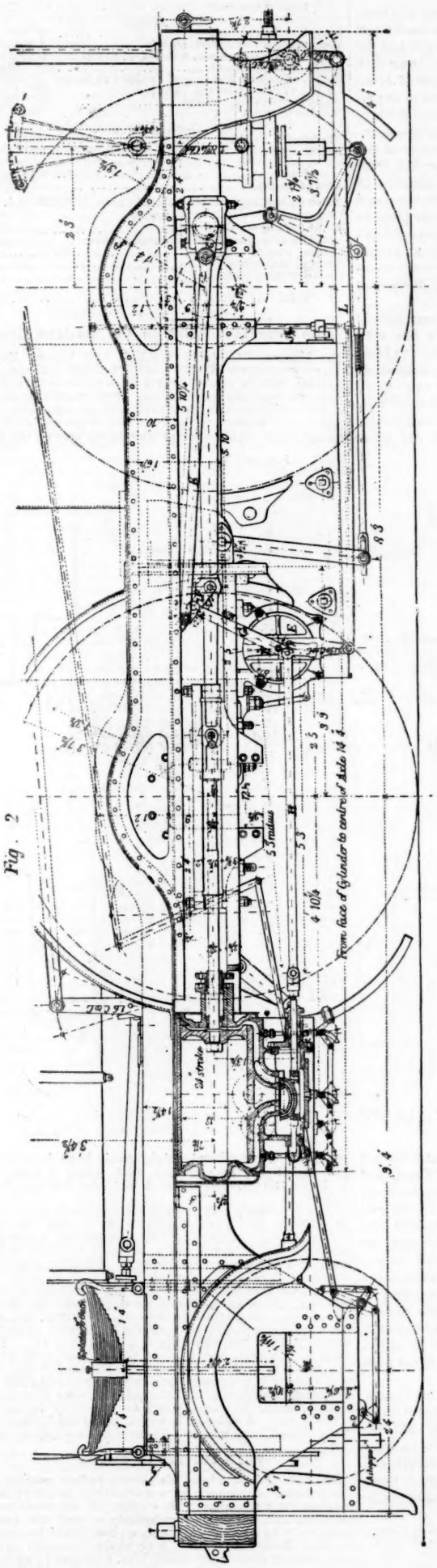


Fig. 2

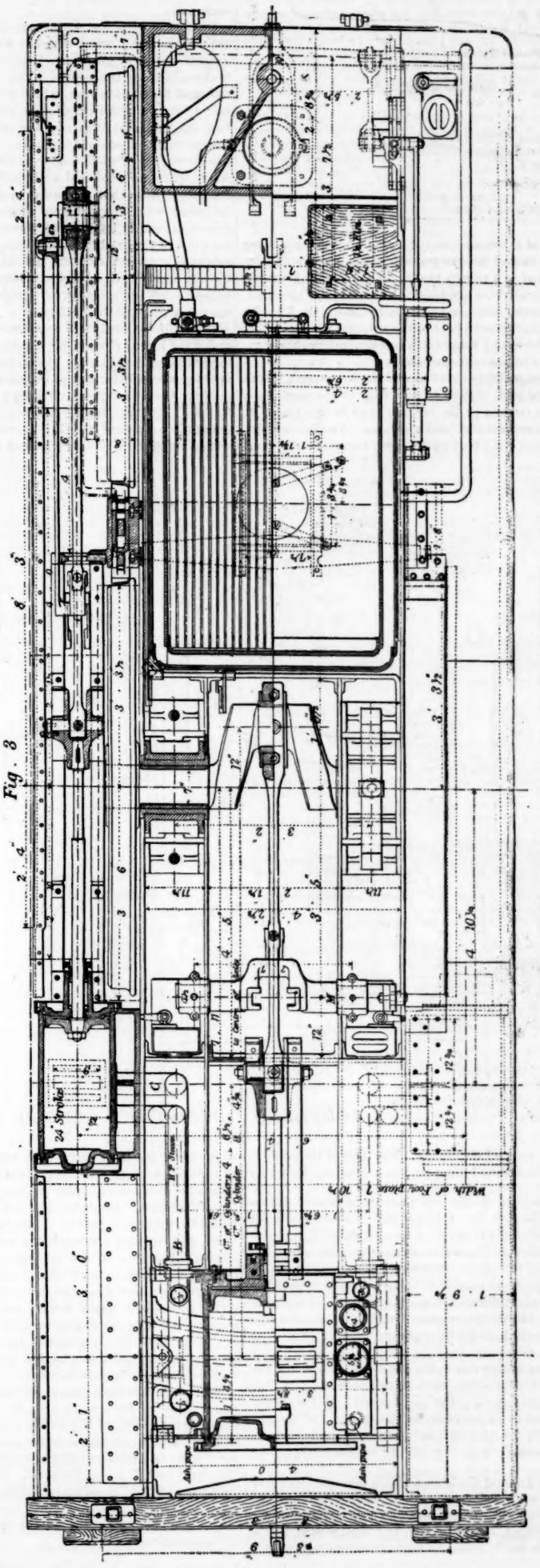


Fig. 3

COMPOUND LOCOMOTIVE, LONDON & NORTHWESTERN RAILWAY.

length of the valve-rod link; and working in their grooves are brass slide-blocks *F*, carried by the lifting links *G* to the lower end of which is attached the valve-rod link *H*, and to

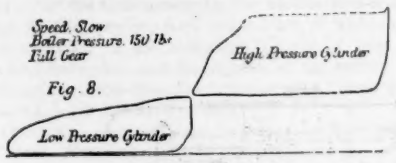


Fig. 8.

Scale, 56 lbs per inch

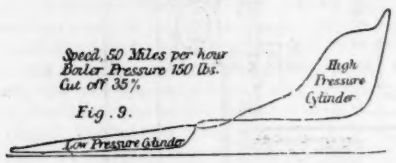


Fig. 9.

the upper end of the compensating link *J* on the connecting rod; the upper end of the compensating link is controlled by a rod *K* attached to a return crank on the trailing crank-pin. The quadrant bars are lengthened out below the disks, so as to allow attachment to be made, by the link *L*, with the reversing shaft placed behind the trailing wheels. The reversing is effected by means of a screw-and-lever arrangement connected to the reversing-shaft.

The high-pressure slide-valves are of the Allen type, which gives double the lead shown at the edge of the port when the piston is at the end of its stroke; they have a travel of 3⅛ in. in full forward and backward gear. The lap is ¾ in. and the lead 1/16 in.; the port opens ¾ in. for admission, and closes at 70 per cent. of the stroke. The sizes of the ports in the cylinders are: steam 1⅛ in. by 9 in.; exhaust, 2¼ in. by 9 in.

The valve motion of the low-pressure cylinder differs slightly from that of the high-pressure. Instead of disks there is a cast iron-shaft M, Figs 1 and 3, carried in brackets, which are fixed to the inside frames; and the quadrant guides are bolted to it in the middle of its length. The other parts of the motion are similar to those of the high-pressure cylinders, the only difference being that the end of the compensating link in the low-pressure motion is attached to a radius rod *N* centred on the back-plate of the cylinder. At one end of the reversing shaft is fixed a lever, which is coupled direct by a long rod to the reversing handle on the footplate. The travel of the valve in full gear is 4½ in., lap of valve 1 in., lead 3/16 in.; the port opens 1 in. for admission, and is closed at 75 per cent. of the stroke, and the exhaust closes at 93 per cent. of the stroke. The sizes of the ports are: for steam, 2 in. by 16 in.; exhaust, 3¼ in. by 16 in.

The reversing gears of the high and low-pressure cylinders are designed to work independently of each other, and no inconvenience has been experienced by this arrangement; they could if desired be connected, but this would mean complicating the parts, while no material advantage would be gained.

With regard to the degree of expansion at which the engine is worked, in practice the low-pressure cylinder is kept nearly in full gear, while all the expansion is done in the small high-pressure cylinders, so that no more steam is used than is absolutely necessary to do the work*

* Figs. 8 and 9 show indicator diagrams taken from the "Experiment" at different speeds.

The commercial results with the engine "Experiment" have been very satisfactory, the limited Scotch and Irish mails being worked between London and Crewe at an average consumption per train mile of 26.6 lbs. of coal, compared with 34.6 lbs., the average consumption of the standard four-coupled passenger engines with 17 in. cylinders and 24 in. stroke, the boilers being precisely the same in each case.

One of the principal features in the new engines has been the adoption of a boiler with the water space of the firebox carried under the grate, fig. 1, the space between it and the firebars forming the ashpan. The object is to do away with the rigid foundation ring, which is always a source of trouble; to obtain better circulation for the water; and to prevent the lodgment of dirt on the sides of the firebox where subject to the most intense heat. A flanged mouthpiece, similar to that of the fire-door, is formed in the centre of the water space, and covered with sliding doors worked from foot-plate, so that the ashes can be easily removed or dropped; while any sediment that may collect in the water space can readily be removed through the wash-out plugs in the sides of the fire-box, there being a clear passage from side to side when the covers are taken off. The mouth of the ash-pan is made of such a width that the tube-plate can be taken out and replaced by a new one, without disturbing the other parts of the firebox.

The leading axle, it will be noticed, is placed immediately under the large cylinder, fig. 1, and nearly in a line with the centre of the chimney, the distance from leading to front driving wheels being 9 ft. 4 in., and from front driving to trailing wheels 8 ft. 3 in., making a total wheel base of 17 ft. 7 in. To overcome the disadvantage attached to such an unusually long rigid wheel base, the leading axle is provided with a radial box, having a lateral movement of 1¼ in. to each side of the centre line of the engine. The box is formed in a single casting, with the brasses fitted in each end, and works between curved plate guides, stretching across from frame to frame. Inside the box and under the axle are carried two horizontal helical springs, coiled right and left hand, and working one inside the other, so that when the engine enters a curve the springs are compressed toward one side and take any shock that may be transmitted through the wheels from the rails; and when the engine gets on to the straight again the springs resume their normal position and keep the engine central. This class of axle-box (see detail view, fig. 7, annexed) has now been in use seven years with very good results, and 155 engines are fitted with it, 40 of them being double-enders.

The journals of the axles, it will be seen, are long in each case. Those of the leading axle are 10 in. long and 6 in. in diameter; while those of the front driving axle are 13½ in. long and 7 in. in diameter, with crank journal 5½ in. long and 7¾ in. in diameter; and the trailing axle journals are 9 in. long and 7 in. in diameter. The advantage of these long journals has been amply proved in the running of the "Experiment."

Appended is a statement of the leading dimensions, etc., of these engines:

THREE-CYLINDER COMPOUND EXPRESS PASSENGER LOCOMOTIVE.

	Cylinders.	In.
Two high-pressure outside cylinders	Diameter	13
	Stroke	24
One low-pressure inside cylinder	Diameter	26
	Stroke	24

Joy's valve motion.

	ft.	in.
Wheels.		
Diameter of leading wheels, with radial axle-box	3	6
Diameter of front driving wheels (low-pressure cylinder)	6	6
Diameter of hind driving wheels (high-pressure cylinders)	6	6
Distance between leading and front driving wheels	9	4
Distance between front driving and hind driving wheels	8	3
Total wheel base	17	7
Boiler.		
Length of barrel	9	10
Mean diameter of barrel, outside	4	1 3-16
Length of firebox inside, 4 ft. 9½ in. at top	4	10⅛ at bottom
Width of firebox inside	3	5⅛
Height of firebox from top of fire-bars to crown	5	5½
Length of tubes between tube-plates	10	1
Diameter of tubes, outside	0	1⅞
Number of tubes	198	
Heating Surface.	sq. ft.	
Firebox	103.5	
Tubes	980	
Total	1083.5	
Area of firegrate	17.1	

Ratio of heating surface to grate area = 63.35 to 1.

Weight.	lbs.
Weight of engine when empty	77,840
Weight of engine when in working order:	
Leading wheels	23,296
Front driving wheels	31,808
Hind driving wheels	29,456
Total	84,560

An Important Point on the Mexican Central.

The Mexican Central's track is now beyond Zacatecas, the greatest silver mining centre in North America, and by the time this is received in Boston trains will probably be running regularly to that point. But on my visit there were still 17 kilometres of track to be laid, or something over 10 miles. We walked in over the line of the railway, for, although there was a shorter and easier way by the carriage

Fig. 5

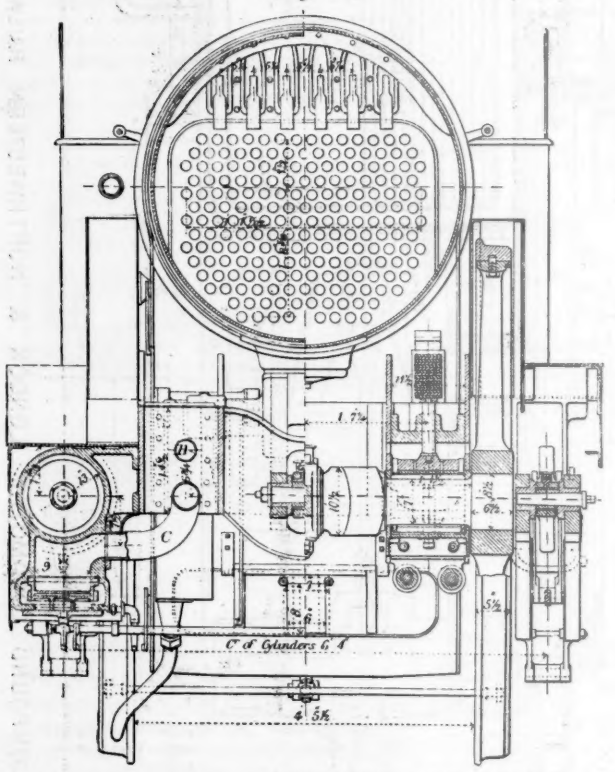
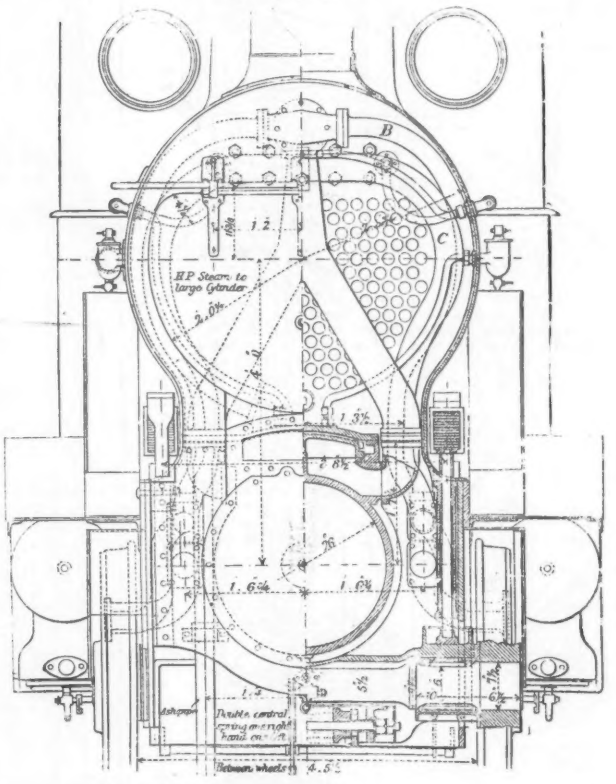


Fig. 4.



COMPOUND LOCOMOTIVE, LONDON & NORTHWESTERN RAILWAY.

road, and a conveyance might easily have been obtained, the official of the company with whom I was wished to inspect the road-bed, and I had some curiosity to see it myself.

Zacatecas has a bad name as far as climate is concerned. Its altitude, 8,037 ft., brings it pretty near the clouds; indeed, directly among them very frequently. Consequently there is a deal of damp, chilly, overcast weather, and much complaint of colds and pneumonia. Moreover, although the winter often brings a snowfall, there is little or no means of artificial heat, and the people get hardened to the cold weather. As in most Spanish-speaking countries they have an idea that the warmth from fires is unhealthy, and, though the word hogar (hearth) is common in Mexico in its figurative sense, yet the thing itself is hardly known. In New Mexico, however, the winters are so cold that artificial warmth is necessary, and one of the pleasantest features of that country is the cheery fires which greet one even in the humblest dwellings; piñon, mesquite or cedar sticks, blazing brightly in the fireplaces, which are generally in the corner of the rooms. Zacatecas, however, could hardly keep warm if she wished, owing to the dearness and scarcity of fuel.

A CROOKED UP GRADE.

But I am talking about Zacatecas before getting there. The weather with which we were favored certainly did not bear out the reputation of the region. It was clear and the sun shone hot, but not uncomfortably so, and the pure air made walking a delight. We soon came to the beginning of the great Zacatecas grade. A short time brought us to the slope looking down upon Guadalupe, a pleasant looking city of about 20,000 inhabitants. The population of Zacatecas overflows into Guadalupe, and many of the business men live there by preference, the climate being more agreeable, for the altitude is several hundred feet less. As we gradually ascended we gained a fine view of the wide valley plain spreading far away to the eastward, brown and sun-lit, the green fields of grain looking like the shallow places in the sea. The large lake in the distance faced us from every point, as our way curved along the slopes, and changed shape continually, ex-

panding as we rose. Down in the valley skirting the meagre little stream ran the short stretch of the Mexican National Railway designed as a branch from San Louis Potosi to Zacatecas, and completed between Zacatecas and Gaudulupe in accordance with the terms of the concession. In spite of its high cost of construction, made exceptionally so by the necessity of carting all the material overland, it is now paying while serving as a suburban tramway over which cars are run every hour by animal traction. We could hear the squealing of the wheels as they passed over the sharp narrow gauge curves, toiling up the steep grade, the cars looking like toy vehicles, far below us. The road showed itself to be of substantial construction, with handsome iron bridges, massive masonry, and running through deep rock cuttings.

Meanwhile, we were progressing steadily upward along a uniform grade, and twisting around curves which would shame the famous horseshoe bend of the Pennsylvania Railroad almost into a straight line. This Zacatecas grade is the most difficult piece of construction which the builders of the Mexican Central have had to deal with for its entire length, and even here tunnels have been avoided. It is a remarkable thing that a line of railway over 1,210 miles long, running along the backbone of a mountainous country, should not have a tunnel for its entire length, nor any grade exceeding 1½ per cent. In fact, the only tunnel which will be encountered along the whole line from the city of Mexico to the Alleghanies is that of the Raton Pass on the Atchison, Topeka & Santa Fe Railroad at the state line between New Mexico and Colorado, and by taking certain routes between Chicago and Boston, that would be the only tunnel between Mexico and Boston; a striking circumstance for a railway journey of something like 2,400 miles on the American continent.

THE CITY OF MINES.

After what seemed like a considerable distance in the solitude of the narrow valley a sudden turn around a curve brought us in sight of the city. It lay at the upper end of the valley, occupying all the spare space, its streets sprawling aaound below us like threads in a tangled skein. The buildings filled up the narrow side valleys and stood upon the mountain sides in irregular masses. There were mines all around us—above on the very summits, at our side and far below. Their solid stone structures, standing on so many slopes and eminences, flanked by heavy fortified walls to protect their treasures against the attempts of robbers, gave us an idea of the importance of the enterprises that built them. The buildings had the effect of feudal castles in their wild positions. Smooth, hard roads zigzagged their way up the heights to these places, and here and there carts crawled along, loaded with treasures for the reduction works below. These great establishments bordered the course of the stream, and we could see within their enclosures the mules making the long rounds, treading over the beds of pulverized ore, moistened to a paste, as required by the tedious pátio, or courtyard process in vogue in Mexico. Scattered about stood round, tower-like structures, some 15 feet high, with light smoke rising from them; kilns in which the ores were roasting.

At the mouths of the mines were great heaps of rock broken into small pieces; they had been accumulating there for generations, the stone removed in running the shafts. Many shafts were close beside the track which we were traversing, and the most of the ballast, which had been spread ready for the ties and rails, was composed of this broken rock, considerable of it low grade ore which it would not pay to work. Probably many thousands of dollars' worth of silver are contained in the ballast of the Mexican Central along here. At one place there was a deep shaft directly on the line of the track, the railway crossing over it by a bridge. At the mouth of another shaft, beside the road-bed, a man sat cracking rocks. We thought at first that he was breaking ballast, but he was sorting ore from a heap beside him, holding the pieces between the soles of his bare feet as he broke them with a blow from his hammer, throwing the fragments into various little piles, according to the grade of the ore, which his experienced eye detected at a glance. The ore was a grayish quartz, and we could plainly see the native silver glistening in many places. The man said he received three reals, 37½ cents, a *carga* for his work —a *carga* being 300 pounds, the established weight for a donkey load of any material.

One shaft beside the track was being laboriously relieved of its water by a crude arrangement of a ponderous windlass turned by a mule, and with a donkey-skin bucket, with the hair on the outside, at the end of the rope. The bucket held perhaps a half barrel of water, and it did not look as if more than 25 bucketfuls could be raised an hour. Many of the best mines of Zacatecas are said to be unworked now, on account of the difficulty of pumping them out at their great depth, the high price of fuel making the cost too great. All this will be changed when railway connection is made with the north, for then cheap coal can be brought from New Mexico; and it will be possible to import pumping and general mining machinery at reasonable cost, all of which will work a great change from the prevailing primitive methods.

AT THE STATION.

The grade of the railway keeps steadily upward until the station grounds are reached. Here there is a level space of several hundred feet in length, after which the down grade toward Fresnillo begins, with many curves at first, and afterward a tangent of 47 kilometres. The station grounds are on the divide between the Atlantic and Pacific slopes, the line running on the former side of the Sierras all the rest of the way to the boundary. The Mexican Central runs on the Atlantic slope for the first part of the way out of the city of Mexico, and just before reaching Queretaro crosses to the Pacific side, which it keeps as far as Zacatecas. The main line thus has a stretch of about 469 kilometres on the Pacific slope, or little over a quarter of its length.

The station at Zacatecas is the next to the highest point on the line, the highest being kilometre 118, where the line passes over the mountains shutting in the valley of Mexico at an altitude of 8,135 ft. Looking back from near the station the track can be seen in three different places as it curves along the slopes. The heart of the city lies far below though its outskirts straggle up to this point and spill over on to the Atlantic slope. The way down is over a smooth but steep street. The inevitable street railway is projected for Zacatecas, but its construction through the steep, narrow and crooked streets will be a matter of more than usual difficulty, and it will require an exceptional amount of mule power to haul the cars up the hill to the station. A cable line would be more efficient and economical if it were practicable in crooked streets.

A BUSTLING CITY.

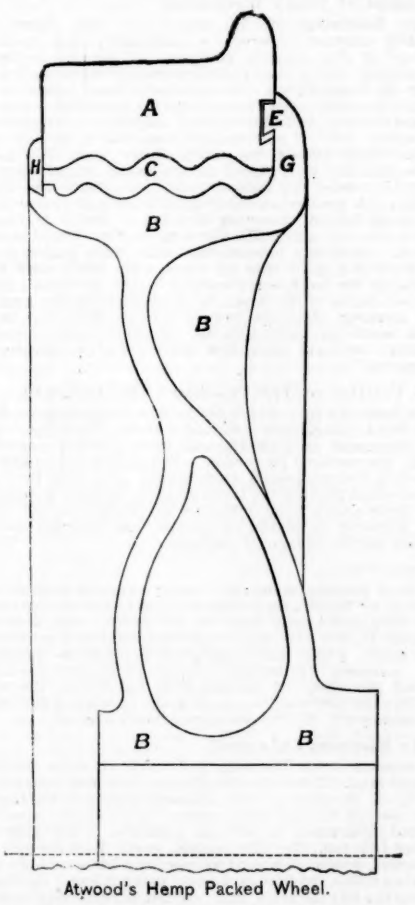
Zacatecas has the appearance of a bustling, busy town, and it is said to be one of the best business points in Mexico. Its population is estimated at 75,000 or 80,000. Great preparations for the celebration of the coming of the railway were in progress, and every building in town, except those with fronts of carved stone, was receiving a fresh coat of paint. In the centre of the town the buildings are high, and the narrow streets make them look still higher. Many of the side streets are so steep that they are impassable for carriages, and some of them are simply long stairways up the mountain sides. Such a street is that which honors the centennial of American independence; the Callejon del 4 de Julio, 1876; Lane of the Fourth of July, 1876. I noticed that the hotel where we dined really had a cellar, the first cellar I had seen in Mexico, but one side of that cellar was the lower story on the other street.

A great increase of prosperity is expected from the railway, and much building is going on. The city is so crowded that, in order to obtain room, they are throwing arches over the river in many places, and building houses upon them, thus converting the stream into a covered sewer, like Stony Brook in Boston. From across the stream the backs of the houses make a striking appearance, with their irregular construction and many projections. In its normal state this river would run through a bootleg. Water is a scarce and precious article in Zacatecas. In the plaza there is a large fountain, running a clear stream, and it is surrounded by a crowd of water carriers all through the day. They often have it bailed dry and anxiously wait for it to fill up enough for them to dip. I was told that sometimes it was difficult to get enough water at the hotels to bathe with. There is a stately aqueduct running into the town, and various smaller aqueducts besides, serving the reduction works. It is likely that the pumping out of the mines will largely increase the water supply, while the general introduction of steam machinery will increase the demand for water. * * * * *

In the 284 years from 1548 to 1832 the amount of silver produced at Zacatecas was $656,043,335, and probably up to the present time the district has produced $1,000,000,000 at least. It is estimated that the average yield of all the Zacatecas ores since the foundation of the city has been $70 a ton, while the range goes as high as $1,000 a ton. The average yield has been more than double that of the ores of the famous Comstock lode. Mining in Zacatecas has evidently still a great future. On our return to the end of the track we took the cars of the Mexican National to Guadalupe. They were standing in the plaza, and had a familiar look, being the same as those used on the circuit of the baths in Mexico, a tramway line which was formerly owned by the Mexican National. They were shipped overland in sections for use here. The time was at hand for starting, but still there were no mules. At last the driver took his placeon the front platform, let off the brake, and away we started, with no motive power except the force of gravitation. It was down grade all the way to Guadalupe, and the mules had been sent back thither in a drove to pull the cars back again. Several cars, first and second class, composed the train, each car detatched and a few dozen feet from the preceding and following. The heavy grade gave us a high rate of speed, and we made the trip down in quick time. At Guadalupe, which is a pleasant looking city, with some attractive public grounds, we found a conveyance which took us back to our train.—*Correspondence Boston Herald.*

The Car Wheel of the Future.

This important question formed the subject for discussion at the recent monthly meeting of the New England Railway Club, held at Boston, Jan. 30. Some 75 gentlemen were present, a larger attendance than has hitherto obtained at any meeting of the Club. The meeting having been called to order, a paper on the car wheel of the future was read by Mr. J. M. FORD, of the Boston & Albany Railroad, who strongly advocated the adoption of steel-tired wheels with rigid bodies in place of chilled wheels, the superior safety and economy of the former being shown by statistics.*



Atwood's Hemp Packed Wheel.

Mr. HENRY S. DRINKER, of Philadelphia, then read a paper on the Atwood Hemp-Packed Wheel, of which the following is an abstract:

The inventor, Mr. Anson Atwood, was the original patentee of a form of car wheel now in general use, the centre consisting of two plates starting from the hub and uniting in one plate half-way between the hub and the rim. The wheel of the future should be composed either of one piece or of as few pieces as possible, which should be safely secured together without the use of bolts and nuts. The wheel in question is believed to fulfill these conditions.

It is shown in the illustration. *A* is the steel tire, which is made considerably larger than the cast-iron centre or body of the wheel *B*. Into a space *C*, of about half an inch between the inner surface of the tire and the outer surface of the rim of the centre, hemp-packing, so prepared as to be practically indestructible, is driven in solid by a steam hammer. The packing holds the tire immovably in place, as the hemp packs and lodges in corrugations and pits in the inner surface of the tire, and against lugs cast on the rim of the centre. A wrought-iron ring *H* is then shrunk over the opening made for the introduction of the hemp. This ring is not essential to the safety of the wheel, as it serves merely as a cover-plate. On the flange side of the tire, a flange *G* on the centre or body of the wheel fits into a groove *E* cut into the tire. This flange on the centre can be made of any required size, and the inner edge of the joint is beveled, so that the tire may be held in place in case of a breakage.

There then is a steel-tired wheel composed of three essential parts, a cast-iron centre, a steel-tire and a hemp packing between the centre and tire.

The advantages claimed for the wheel are:

1. The tire is secured upon the centre without bolts or rivets, avoiding both the rigidity produced by such fastenings and the accidents resulting from their working loose.
2. The tire is not shrunk on, and is free from the defects produced by welding or shrinking tires on the centre.
3. The hemp packing breaks all metallic contact and rigidity, and introduces a resilient body between the tire and the body of the wheel, preventing vibration and deadening the noise.
4. The wheel is simple in construction, and can be made at any well-equipped railroad shop.
5. When the tire is worn out, the centre can be used again.
6. It is safe, as there are no bolts or rivets to shake loose, and the tire is securely held by the hemp.

A section of a wheel that had run 280,000 miles under a heavy Wagner car was exhibited at the meeting, the wear being ⅛ in., and the packing was apparently firm and uninjured. Hemp packing has been used with satisfactory results between the arms and rims of rolling-mill fly-wheels, and tests made by Professor W. D. Marks, of the University of Pennsylvania, tend to show that the hemp packing effectually prevents the tire slipping on the wheel centre.

Mr. F. D. ADAMS, Boston & Albany Railroad, gave the following statistics as to the satisfactory wear of the 1,597 steel tired wheels running on the Boston & Albany Railroad Jan. 1, 1884:

2	wheels	have made	557,192	miles.		
5	"	are running	between	400,000	and	500,000 miles.
95	"	"	"	300,000	"	400,000 "
427	"	"	"	200,000	"	300,000 "
562	"	"	"	100,000	"	200,000 "
506	"	"	"	1	"	100,000 "
1,597	"					

These wheels have made mileage as under before the first turning:

344	wheels	have run	between	100,000	and	150,000 miles.
88	"	"	"	150,000	"	200,000 "
55	"	"	"	200,000	"	300,000 "

While the following number of wheels have never been turned:

24	wheels	have run	between	150,000	and	200,000 miles.
16	"	"	"	200,000	"	250,000 "
13	"	"	"	250,000	"	300,000 "
3	"	"	"	300,000	"	400,000 "

Mr. RICHARDS, of the Boston & Providence Railroad, opened the discussion and gave a brief description of the different styles and makes of car wheels now in use.

Mr. GAREY: A good chilled cast-iron wheel is a safe wheel to run, and out of 100 accidents 99 are attributed to other causes than broken wheels, and therefore the remarks "that a cast-iron wheel was not a safe wheel to run under passenger equipment" appeared incorrect. More care should be exercised by wheel-makers in the manufacture of chilled cast-iron car-wheels.

Mr. CHAMBERLAIN: It was not of much consequence who made the steel-tired or cast-iron wheels as long as they could produce a wheel which was perfectly safe and gave good mileage.

After some further discussion, in which the Allen paper wheel was spoken of very highly as a safe and durable wheel, and the Cooper elastic steel-tired wheel was also commended, the meeting adjourned.

*A detailed abstract of this paper is given in the *Railroad Gazette* of Feb. 1, 1884.

Cable Railroads in New York.

The New York *Times* of Feb. 10 thus describes and sums up the work of the new commission appointed to lay out rail road lines in New York city. The application under which the Commission was appointed had special reference to the construction of railroads to be operated on the cable plan:

By holding a session from 10 o'clock in the morning until after midnight, the Rapid Transit Commissioners yesterday finished the work of locating additional routes for steam railways up and down and across the city. The most difficult part of the work of the commission is thus accomplished. During the next 30 days the kind of superstructure and mechanical construction will be discussed and decided upon, and in the 30 days following then the Commissioners will create a corporation and receive subscriptions for capital stock with which to build and operate the new lines. Upon the organization of the corporation the franchises granted by the commission will be handed over to the officers and directors. The salaries and expenses of the Commissioners will be deducted from the capital stock. The corporation receiving the franchises will be compelled to test the constitutionality of the act of the Legislature prohibiting the laying of tracks for steam railways across Broadway and Fifth avenue below Fifty-ninth street. In the opinion of Counsel Charles P. Shaw the corporation will build its transverse lines from the Hudson and the East rivers as far as Fifth avenue or Broadway, where they will be stopped by injunctions by the horse-car railroad companies. The matter will then be taken into court and definitely settled. The responsibility of the Commissioners ceases when they transfer their franchises to the corporation formed.

At the meeting last evening Chief Engineer Sloane and Counsel Robert Deyo, of the Manhattan Railway Co., appeared with the intention of asking the Commission for extensions at the terminal points of two of their lines and for changes in some of the curves, but after discussing the matter for three hours, and being pressed for time, they withdrew.

The routes as passed and corrected are as follows:

Route No. 1.—The Lexington-avenue route, the most important of all, was adopted Jan. 5, but the fact was not made public until yesterday, for the reason that the vote upon it was not unanimous. The route will begin at the Harlem River, and will run southward along Lexington avenue and through the elevated railroad company's machine-shops, at Ninety-eighth and Ninety-ninth streets, to and through Gramercy park, which is also private property, into Irving place. At Fourteenth street it will cut through private

property to reach Twelfth street. From here it will turn into Fourth avenue and hence along Astor place to LaFayette place, across into Great Jones street, and through private property to Bond and Bleecker streets, where it becomes an elevated road by means of an inclined plane. It will then run along Crosby street, and, by using private property, turn into Elm street. It will then reach Centre street through private property and pass to Chatham street by way of Tryon row, connecting at Chatham street with the Brooklyn Bridge. From the bridge it will cut through the building now occupied by the Coroners, adjoining French's Hotel, and run into William street as a surface railroad. It will leave William street at Wall street, and, running up Wall street to and into Broad street, will reach the South Ferry by way of Broad street, Pearl street and Whitehall street. A branch line will extend from William street to Wall street ferry by way of Wall street. It is expected that this line will be operated on the cable system, at a speed of 8½ miles per hour on the surface and a much more rapid speed for the elevated section. The fare at all times will be 5 cents, with an addition of 3 cents for transfers east or west.

Nos. 2, 3 and 4.—Consolidated with other routes.

No. 5.—From the Hudson River to the East River, by way of Liberty street and Maiden Lane; returning by way of Maiden Lane, Cortlandt street, and West street.

No. 6.—From the Hudson River to the East River, by way of Chambers street, New Chambers street and James slip; returning, by way of James slip, New Chambers street, Duane street and West street, with a connecting branch from Madison street to Grand street at the East River, by way of Madison street and Grand street.

No. 7.—From the Hudson River to the East River by way of Watts street; private property on Watts street, between Thompson and Broome streets, Broome street, Mangin street, Broome slip and East street; returning by the same line.

No. 8.—From the Hudson River to the East River by way of Barrow, West Fourth and East Fourth streets, returning over the same line.

No. 9.—From the Hudson River to the East River by way of West Fourteenth street, Eighth avenue, Greenwich avenue, Thirteenth street, Second avenue, St. George's place, First avenue and East Thirteenth street, returning over the same line.

No. 10.—From the Hudson River to the East River by way of Twenty second street, returning the same way.

No. 11.—From the Hudson River to the East River by way of Thirty-fourth street, returning the same way.

No. 12.—From the Hudson River to the East River by way of Forty-second street, returning over the same street, with a connecting branch from First avenue to Thirty-fourth street ferry by way of First avenue and East Thirty-fourth street.

No. 13.—From Tenth avenue and Fifty-ninth street to the foot of Madison street, by way of Fifty-ninth street, Madison avenue, East Twenty-third street, Second avenue, Houston street, Chrystie street, Division street, Catharine street, and Madison street, returning the same route, with a connecting branch from Eighth avenue and Fifty-ninth street to One Hundred and Sixty-second street by way of the Boulevard.

No. 14.—From the Harlem River to the Hudson River, by way of One Hundred and Twenty-sixth, Lawrence street, the Boulevard, and One Hundred and Thirtieth street, returning over the same route.

No. 15.—From the Hudson River to the Harlem River, by way of Inwood street, King's Bridge road, and Dyckman street, returning over the same route.

No. 16.—A connecting branch from Eighth avenue and One Hundred and Fifty-fifth street, to the Central Bridge over the Harlem River, by way of One Hundred and Fifty-fifth street and Seventh avenue, returning over the same route.

No. 17.—Traffic Road No. 1, west.—From the Hudson River at Sixty-fifth street to the western entrance of the transverse road across Central Park, known as Traffic Road No. 1, by way of Sixty-fifth street and Eighth avenue.

No. 18.—Traffic Road No. 1, east.—From the East River at Sixty-fifth street to and across Fifth avenue, to connect as near as may be with Route No. 17.

No. 19.—Traffic Road No. 2, west.—From the Hudson River at Seventy-ninth street to the western entrance to the transverse road crossing Central Park, known as Traffic Road No. 2, by way of Seventy-ninth street, Ninth avenue, Seventy-seventh street and Eighth avenue.

No. 20.—Traffic Road No. 2, east.—From the East River at Seventy-ninth street to and across Fifth avenue to the eastern entrance to Traffic Road No. 2, across the park, connecting, as near as may be, with Route No. 19.

No. 21.—Traffic Road No. 3, west.—From the Hudson River at Eighty-sixth street to the western entrance to Traffic Road No. 3, across the park by way of Eighty-sixth street.

No. 22.—Traffic Road No. 3, east.—From the East River at Eighty-sixth street to the eastern entrance to Traffic Road No. 3, across the park by way of Eighty-sixth street, Avenue A, Eighty-fifth street, connecting, as near as may be, with Route No. 21.

No. 23.—Traffic Road No. 4, west.—From the Hudson River at Ninety-sixth street to the western entrance of Traffic Road No. 4 across Central Park, by way of Ninety-sixth street, Ninth avenue, Ninety-seventh street and Eighth avenue.

No. 24.—Traffic Road No. 4, east.—From the East River at Ninety second street to the eastern entrance of Traffic Road No. 4 across the park, by way of Ninety-second street, First avenue and Ninety-seventh street, connecting as near as may be with route No. 23.

No. 25.—From the Harlem River at Broadway, in the Twenty-fourth Ward, to the northern boundary of the city at Broadway, by way of Broadway.

No. 26.—From Division street, near the Metropolitan Elevated Railway station, to South Ferry, by way of Division street, Catherine street, South street, and Coenties Slip.

No. 27.—From Tenth avenue, at One Hundred and Eighty-first street, to Aqueduct avenue across the proposed bridge over the Harlem River at One Hundred and Eighty-first street, by way of One Hundred and Eighty-first street and the bridge.

No. 28.—From First avenue at the Harlem River to Twenty-third street and Second avenue, by way of First avenue and Twenty-third street.

No. 29.—From Christopher and West streets to the Hudson River Railroad station at Seventy-second street, by way of Thirteenth avenue and Twelfth avenue. In this route the two avenues intersect each other.

The first meeting of the commissioners was held in the Mayor's office on Dec. 12, 1883. The board was formally organized with Daniel Drake Smith as President. R. L. Ogden was appointed Acting Secretary. At the next meeting, which was held at 64 Cedar street, on the day following, the work of the board began. In the evening of the same day an adjourned meeting was held at the Fifth Avenue Hotel, when the Commission was addressed the by Hon. William Dorsheimer, Gen. Egbert L. Viele, S. E. Church, and William P. Shinn, President of the National Cable Co. On Dec. 14, at a meeting at No. 64 Cedar street, resolutions were offered declaring that there existed a necessity in the city for additional steam railways for transportation of passengers, mails or freights. Ten days later these resolutions were passed. Permanent rooms were selected in the *Tribune* Building, Dec. 18, and on the following day the Commissioners gave notice of public meetings every afternoon. At these meetings the Commissioners listened to addresses on the necessity for rapid transit facilities by Prof. E. T. Cox, Charles H. Phelps, Lawson M. Fuller, Platt K. Dickinson, Dwight H. Olmstead, Orel D. Orvis, Mr. Roosevelt, ex-Judge Abraham B. Tappen, of Fordham; Justice James R. Angel, of Morrisania, and Gen. Viele.

The Commissioners, on Dec. 28, decided to send to the signers of the original petition to the Mayor a circular inviting them to submit suggestions, routes or plans. Of the 113 signers less than a dozen responded. In subsequent meetings, until Jan. 8, the commissioners did little else than listen to suggestions from property owners from various parts of the city. Among those who offered suggestions were Isaiah Nutt, James B. Brady, Justice Angel, John Hayes, General Viele, John J. Macklin and Peter McCullough. Among the communications received was one from Henry Bergh recommending the adoption of the cable system. Charles P. Shaw was elected Counsel to the board on Jan. 3. On Jan. 9, in response to the invitation of the National Cable Co., the Commissioners left the city to inspect the workings of the cable system in Chicago, and returned Jan. 14. On Jan. 15 the commission resumed public sessions, and was addressed by J. O. B. Webster, of the Department of Public Works; by Robert Hardie, of the Pneumatic Tramway Engine Company; by B. G. La Motbe, of the United States Tubular Rolling Stock Company, and by James Montieth, of Washington Heights. From that day until the beginning of this week the meetings were for the most part monopolized by inventors who presented plans and models for various devices calculated to solve the rapid transit problem. Among the inventors who appeared in person were William F. Sherman, of Chicago; D. M. Pfautz, of Philadelphia; L. J. Wing, Frank A. Bartholomew, Norman Allen, Dr. Thomas S. Lambert, Frederick William Weiss, O. C. Woolson and Daniel E. Bishop, of New York. Mayor Edson visited the Commissioners on Jan. 29 to ask if they wished an extension of time in which to complete their work. On Jan. 26 the Commissioners examined the workings of George A. Dubreuil's steel band rapid transit system at No. 467 Tenth avenue, and on Feb. 1 they employed Gen. Egbert L. Viele as Engineer of the board. During the week just ended the location of routes occupied the time of the Commissioners.

THE SCRAP HEAP.

Bad Weather.

"I have been 28 years in the service of the New York Central Railroad," said a well-known conductor, "and I have never experienced so disagreeable a month for railroading as that of January, 1884. Trains have been delayed by storms more than ever before in 30 consecutive days. We have had heavier snows that have completely blocked the road for a week, but never before a succession of so many storms."—*Exchange.*

Attempt at Train Wrecking.

The Bainbridge (N. Y.) *Republican* thus describes a fiendish attempt to wreck a passenger train upon the Albany & Susquehanna Railroad: "Several ineffectual attempts to wreck the evening passenger train on the Albany & Susquehanna Railroad have been made in this vicinity recently. An attempt was made several weeks ago, an arrest made, and the supposed culprit now languishes in the county jail. It now appears that this is not the only arrest which should be made. Last week Wednesday night seven ties were placed in the cattle guard where the railroad crosses the Sidney road, just above the trestle bridge. A gentleman driving by happened to see them, and succeeded in removing them before No. 3 arrived at that point, and thus foiled the designs of the would be murderers. On Friday evening the same train pulled out of the depot at a good rate of speed, and came near being ditched at the Scott street crossing in the yard, and within a stone's throw of the depot, by a tie placed in the guard at that crossing. Luckily the only damage done was to the track, which was badly torn up. If captured the dastardly villains who have done this work should be drawn and quartered."

The Verdict on the Bradford Oil Accident.

The coroner's jury which has been investigating the Bradford, Bordell & Kinzua Railroad disaster, by which a train was consumed on Jan. 15, and three persons burned to death, has rendered its verdict. The railroad company and trainmen are exonerated from blame. The jury finds that the oil which flooded the track escaped through a defective plug from a tank of oil owned by the Anchor Oil Co. Suits will probably be instituted against the railroad and the Anchor Oil Co. to recover damages.

Empty Cars.

A local railway company having an arran gement with another, by which empty cars are sent to the former loaded with freight and sent back to the latter, was decidedly astonished a few days ago to receive a number of cars loaded with snow, which were consigned to them as "empties." The company promptly refused to receive them and notified the agent of the other to that effect. The result was that the cars were unloaded at the expense of the latter.—*Rochester (N. Y.) Democrat and Chronicle.*

Train Robbers Captured.

A dispatch from Wabash, Ind., Feb. 4, says: "On the night of Sept. 27 the Pacific Express car on a train on the Eel River Division of the Wabash Railroad was broken open east of Roann, this county, by three men who had secreted themselves on the car platform as the train was leaving Laketon, the first station east. Bert Loomis, the messenger, was beaten until he was insensible, and the safe was then rifled, $2,000 in money being taken. At Roann the bandits left the train and started for this city on foot, but, taking the wrong road, they early the next morning arrived in Peru, whence they went to Detroit. An immense reward was offered for the capture of the robbers by the railroad and telegraph companies, and Thomas Furlong, chief of the secret service of the Gould system of roads, at once began working up the case. Two detectives were put at work at Peru, and after obtaining a partial description of the bandits from the messenger, and learning that three suspicious-looking individuals had embarked the morning after the robbery for Detroit, they went to that city and systematically began to shadow Denny Downer and John Beaucleigh, two of the most noted crooks in that city. Among the bills stolen were $600 in $10 silver certificates, and it was observed that Beaucleigh and Downer were well supplied with certificates, and so well satisfied that they were on the right trail were the detectives, that on Saturday they summoned Chief Furlong, and the three captured Downer, who had invested in a saloon in Detroit. When accused of complicity in the crime Downer weakened and made a clean breast of the affair, implicating Beaucleigh, who, he said, had gone to Indianapolis. One of the officers then went to Indianapolis, and last night effected the arrest of Beaucleigh and extracted a confession from him. This morning Beaucleigh was brought up from Indianapolis, and Downer, in charge of Detective Furlong, arrived from Detroit immediately afterward. Both are now lodged in jail, but emphatically refuse to talk to newspaper reporters. The third robber is in business in Windsor, Canada, and his identity being established, officers are now waiting for him to visit Detroit, when he will be brought here. The boldness of the robbery and the prominence of the participators as crooks render their arrest important, and their incarceration here to-day creates intense excitement. They will be tried the latter part of the month."

In the Snow Sheds.

Of the Central Pacific snow sheds, the Reno (Nev.) *Gazette* says: "The snow sheds are rarely beautiful now. Sufficient snow has sifted through the cracks to cover the track several feet. The plows have shoved it down and packed it into a solid white marble pavement, with only two streaks of steel to afford contrast. The sides of the sheds are banked up on the outside, and through the cracks the sunlight is strained through snow enough to color it an exquisite blue, too delicate and transparent for imitation."

Locomotive Engineers' Troubles in Mexico.

A dispatch from Laredo, Tex., to the Galveston *News* says: "The locomotive engineers on the Mexican National Railway, between Laredo and Saltillo, Mexico, have organized as a body and will this week present to the company their resignations *en masse* unless some protection is guaranteed them against arrest and indefinite imprisonment in Mexico, when, in discharge of their duty, they inadvertantly run over and kill a Mexican who carelessly gets upon their track. This determination is brought about by the case of the unfortunate engineer Gridner, who several weeks ago ran over and killed a Mexican walking across one of the railroad bridges near Saltillo, and who has ever since been incarcerated in jail in that city. The engineers say they are required to run on schedule time, and it often is not in the power of the railway appliances to stop in time to prevent running over some dare-devils who get on the track immediately in front of the locomotive."

Two Freight Agents.

Railroad men are not exempt from the ills and accidents from which other classes of business men suffer, and among their little annoyances is the one of sometimes having their letters received and opened by the wrong party through mistake. Two prominent freight men in this city, who represent rival lines, have been particularly unfortunate in this respect, owing to a striking similarity in their names—Johnson and Jonson, for instance. Only a short time since one of these little "typographical errors" occurred, which, but for an unforeseen circumstance, might have resulted disastrously to one of the parties. Johnson, in looking over his mail, had opened a letter belonging to Jonson before he discovered his mistake. The letter was from a prominent firm in this city, who do considerable shipping to points on two roads, and asked for a promised rebate on a large shipment that had recently been made.

Now these two agents had solemnly and sacredly pledged their honor, as rival railroads always pledge, to grant no more rebates under any circumstances, not even if the shipment amounted to 100 cars of pork. So of course Johnson howled. "Confound him!" said he. "I could have got that shipment myself for a five-cent rebate, had I known he would play me false on the agreement. I'll make him suffer for it, though, if I have to carry freight for nothing and give a map to boot." And Johnson grabbed his hat and started out to confront his rival with the evidence of his perfidy.

In the meantime Jonson had received his mail and opened it, and, strange as it may seem, one of the letters was addressed to Johnson, but he did not discover it until the contents had been noted. It just happened that this letter was from the same firm and asked the same promised rebate as the one received by Johnson. "Well, this beats me," said Jonson. "That man is a member of the church and a leading light in the Sunday-school. But I might have known he couldn't keep his promise if he saw a dollar in sight. He shall know that I am onto him, however, and I'll make him ashamed of himself." And Jonson snatched up his hat and started to hunt up his weak rival and demand an explanation.

The agents met midway between their respective offices. After glaring at each other for fully a minute they slowly reached into their pockets and drew forth the fatal documents. "This is the way you keep an agreement," said Johnson, handing over the letter. "This is how you break an agreement," said Jonson, handing over his guilt-clincher.

Mutual embarrassment and mutual explanation followed. Johnson acknowledged that he was a backslider, while Jonson admitted that he had been guilty "just that once." The agreement was renewed over a bottle of Billy's best and the two roads are now considered decidedly stingy by the shipper who had formerly found no trouble in getting a cut.—*Louisville Courier Journal.*

The Moses Taylor Hospital.

It will be remembered that the late Moses Taylor left $250,000 for the establishment of a hospital in Scranton, Pa., for the especial benefit of railroad employés and coal miners, to be known as the Moses Taylor Hospital. This fund has just been increased by a gift of $100,000 from Mr. and Mrs. Percy R. Pyne, of New York. Mrs. Pyne is a daughter of Mr. Taylor, and her husband is a director of the Delaware, Lackawanna & Western Co. The trustees have adopted plans for the hospital buildings, and work upon them will soon be begun.

TECHNICAL.

Locomotive Building.

The Mt. Savage Locomotive Works at Mt. Savage, Md., recently shipped to the Anniston & Atlantic road in Alabama a narrow-gauge passenger engine, with 12 by 20 in. cylinders, making the third engine sent by these works to the road named. The East & West Railroad of Alabama has three engines of the same class from these works on its line.

The Schenectady Locomotive Works in Schenectady, N. Y., are replacing a stationary engine of 125 horse-power, which has run in the machine shop since 1848, with a new improved Corliss engine of 200 horse power, and are putting in a heavier line of shafting and adding a number of new tools recently purchased. These works have recently shipped to the Southern Pacific road three passenger engines, weighing 45 tons each, having cylinders 18 by 24 in., and drivers 73 in. diameter; and to the Chesapeake, Ohio & Southwestern six ten-wheel freight engines, with 18 by 24 in. cylinders, and four eight-wheel freight engines with 17 by 24 in. cylinders.

The New York, New Haven & Hartford shops in Hart-

ford, Conn., last week completed a switching engine for use in the Springfield yard.

The Boston & Albany shops have recently completed a passenger engine for the road with 18 by 22 in. cylinders and 66 in. drivers. It has a steel boiler, 52 in. diameter of barrel, with wagon top and 221 tubes of 2 in. diameter. The fire-box is 72 in. long. The engine truck and tender trucks have steel-tired wheels. The engine is similar in all respects to several already in use on the road.

Car Notes.

The Michigan Car Co. in Detroit is working on a large contract for box cars, and has just finished some refrigerator cars for the Kansas City, Springfield & Memphis road. These refrigerator cars are of the Tiffany pattern, of which this company makes a specialty, and which has found much favor for the carriage of dairy products and meat. Negotiations are now in progress for a large number of these Tiffany cars for a Western road. The company has also an order on hand for a large number of coal cars, work on which is to be begun shortly.

The Pullman Car Shops at Pullman, Ill., last week shipped five first-class passenger cars to the Michigan & Ohio Railroad.

The car shops at Cambridge City, Ind., recently completed 100 coal cars with a capacity of 20 tons each for the Wabash, St. Louis & Pacific road.

The Woodruff Sleeping Car Co. is building three combined sleeping and reclining chair cars which are to be run over the Indiana, Bloomington & Western road, between Peoria and Columbus.

The Anniston Car Works at Anniston, Ala., have appointed Messrs. Thomas B. Innes & Co., No. 115 Broadway, New York, their sales agents.

The Youngstown Car Manufacturing Co. in Youngstown, O., has received an order for a number of iron cars to be used on a railroad in Arizona for carrying copper ore.

The shops of the Marshall Manufacturing Co. in Marshall, Tex., have been leased to the Texas & Pacific Railroad and will be used as part of the company's repair shops.

A company is to be organized to build new car shops at Palestine, Tex. The new concern expects to lease a large number of convicts from the state and employ them in its shops. It is probable that the shops will be built at Huntsville instead of Palestine.

The Northwestern Car & Manufacturing Co., of St. Paul, Minn., has taken a contract to build 350 ore cars for the Duluth & Iron Range Railroad.

The Chicago & West Michigan shops in Muskegon, Mich., have just completed four new passenger cars for the road.

The Knoxville Car-Wheel Co. in Knoxville, Tenn., has closed a contract to furnish 6,000 car wheels for the Pullman Southern Car Co. lines.

The Peninsular Car Works in Detroit are completing a contract for 800 freight cars for the Union Pacific road.

Bridge Notes.

The King Iron Bridge Co. of Cleveland, O., has shut down for a few days while removing its machinery to its new shops. The company has contracts on hand for five large bridges.

A new bridge is to be built over the Housatonic River at Bridgeport, Conn., by the New York, New Haven & Hartford Railroad Co. The new bridge will be about 1,100 ft. long and will occupy the site of the present structure. During its erection the road will be carried over the river by a temporary pile bridge a few feet south of the present line.

Iron Notes.

The Gaylord Rolling Mill at Portsmouth, O., was sold recently for $63,350, the purchaser being the Ashland Coal & Iron Co.

Alcalde Furnace at Rusk, Tex., has just been completed and will shortly go into blast. It is owned by the state of Texas and will be operated by the lessees of the state penitentiary.

Of the seven blast furnaces in New Castle, Pa., only one is now in blast, the Rosena Furnace, which is operated by Rhodes & Co., of Cleveland.

The Glasgow Iron Co. at Pottstown, Pa., has now all its works in operation.

The Plymouth Rolling Mill Co, at Conshohocken, Pa., is adding a sheet mill to its plant, and expects to have it in operation very shortly.

The Helmbacher Forge & Rolling Mill Co. in St. Louis have added a new heavy steam hammer to its forge shop. The shops have lately made some very heavy forgings for steamboat and cotton press work.

Manufacturing Notes.

The Armington & Sims Engine Co., of Providence, R. I., has appointed Mr. M. F. Moore its General Agent. He will have his headquarters at No. 15 Cortlandt street, New York. Mr. Moore was Manager of the Locomotive Engine Safety Truck Co. during the life of its patent, and for the past three years has been General Manager of the Edison Co. for Isolated Lighting.

The Niles Tool Works in Hamilton, O, recently furnished the Pullman car shops with two car-wheel borers, two bolt heading machines, one eight-spindle arch-bar drill and five steam hammers.

The Hudson Bell Ringer,

The National Iron & Brass Works in Dubuque, Ia., manufacturers of the Hudson locomotive bell ringer, give notice that they were recently informed that the Lake Shore & Michigan Southern Co. had been sued for using this bell ringer on the ground that it was an infringement of other patents, and promptly replied that they would protect their patrons in the use of this device. The case was tried before the United States Circuit Court for the Northern District of New York at Utica, and the Court has now decided in favor of the Hudson bell ringer, so that railroad companies can now use this device without fear of suits for infringement.

Steel Rail Contracts for New South Wales.

The Government of New South Wales (Australia) being desirous of encouraging the development of the local iron industry is prepared to receive bids for the supply of 150,000 tons steel rails to be manufactured in the colony. There are now no rolling-mills there, and the object of the government is to induce either English or American iron manufacturers to establish works. During the past ten years over 1,250,000 tons of iron and steel have been imported into the colony, this amount, including the material for about 1,200 miles of railroad. The government has under construction or projected over 500 additional miles and the steel rails in question are to be used on these lines. The colony, it is stated, is very rich in coal and iron ore of excellent quality. Bids for these rails will be received until Nov. 30, 1884, at the office of the Agent General in London and until Feb. 10, 1885, at the Public Works Office in Sydney, N. S. W. Printed notice of the preliminary specifications and conditions of contract may be obtained on application at the office of the Commissioner of Railways in Sydney and also from Messrs. R. W. Cameron & Co., New York. The delivery of the rails is to commence not later than Dec. 1, 1886, and to be at the rate of not less than 15,000 tons yearly. Contractors will be required to give in their bids full information as to the process of manufacture they intend to adopt and also whether they will be prepared to manufacture and supply switches, crossings and rail fastenings as may be required from time to time. They must also state whether they intend to manufacture the rails from native materials only or whether they intend to use imported materials. Every facility will be given to intended contractors to examine the position and extent of the raw material in the colony, and all possible information on this subject will be given on application to the Under Secretary of the Land and Mines Department, at Sydney, or to Messrs. Cameron & Co., in New York.

Iron Roofing Shingles.

The Anglo-American Roofing Company, of New York, has furnished all the roofing for the passenger stations on the New York, West Shore & Buffalo road. This roofing, as now made by the company, is composed of shingles 15 in. square, with corrugations of a pattern intended to add to the beauty of the roof, and so arranged as to effectually prevent water from drifting inward. They are laid with a uniform lap of 3 in., so that each shingle covers 1 square foot of roof, and with the points turned toward the eaves and the ridge of the roof, so as to give a diamond pattern. The points are held down securely by a steel clasp. They are preserved from corrosion by the kalamein alloy process, and thus prepared it is claimed that they will last for a very long time, can be rapidly laid by unskilled labor and are finished at a less price than any other roofing of equal value and durability. The accompanying cut shows the shape of the shingles and their appearance.

The Brooklyn Bridge.

Nearly a week of continuous foggy weather, delaying the ferry boats and at times almost stopping them altogether, has thrown a very large traffic upon the Brooklyn Bridge, both in passengers and teams. The bridge has shown that its capacity is sufficient, but there has at times been great delay at the approaches, which are entirely inadequate to pass the crowds which seek the bridge at the busy hours of morning and evening, and the teams during nearly the whole day.

The Gibbon Rail Joint.

The Gibbon boltless rail joint, recently illustrated in our columns, has been subjected to a sharp test on the Delaware & Hudson Canal Co.'s road near Albany, and has in that time shown itself better able to bear the work than the adjoining rails. A distance of 200 ft. has now been laid on the main track of the Albany & Susquehanna road in Albany, at a point where all the heavy switching in and out of the freight yards comes upon the main track, and where the joint will be subjected to a very severe test. The inventor claims as a special excellence of the joint that the large plate which locks the joint to the rails and the tie receives the weight and thereby carries the load like a bridge over to the adjoining rail. He claims that the test joint which has been in use on the track fully illustrates his theory, that is, that the two ends of the rail are supported, bottom and sides, in such a way as to make an absolutely continuous rail. Recent tests made by the Fairbanks Co. for the Gibbon Joint Co. show that with a pressure of 75,000 lbs., in one case there was no sign of failure of joint. In the second case the joint cracked slightly at a pressure of 66,500 lbs. In the third case a pressure of 104,000 lbs. failed to cause any failure, while in the fourth case, where the joint and the two ends of the rails rested upon supports 40 in. apart, no tie being placed under the joint, at a pressure of 67,000 lbs. a failure occured by the tearing apart of the rail-head from the web and by the cracking of both rails from the head at a distance of 7⅛ in. In a test similar to the last the rails failed completely, while the joints showed no sign of weakness. These tests, however, while showing the strength of the joint, do not indicate its behavior in actual use as a trial in the track would do, and the company intends to have the joint thoroughly tried in practical use, not only in Albany, but at other points where it is expected that arrangements will soon be made for its use.

Rain on the Southern Pacific.

The following dispatches from Los Angeles, Feb. 3, note the occurrence of heavy rains—a very unusual thing—on the Southern Pacific: "As a result of the great rains that has prevailed during the past eight days the Southern Pacific Railroad bridge over the San Gabriel River at El Monte is partially washed away. The track at La Puente is under water and impassable. A landslide at Cameron station, north of Mojave, ditched the north bound freight, with two locomotives, stopping yesterday's north bound express at Mojave and the south bound train at Cameron. No trains will arrive from the East or North before morning.

"It is reported that this afternoon at 3 o'clock, on the Colorado desert, near Yuma, a monster waterspout passed along the Southern Pacific Railroad, between Mesquit and Cactus stations, destroying 8 miles of track almost in a moment. Another washout is reported at Sand Creek, south of Mojave station. The Los Angeles and San Gabriel rivers are running bank full, and liable to overflow at any moment. The rainfall for the past week is over 8 in.

"The recent heavy rains have astonished the old, dry bed of the Mojave River by filling it with a stream 300 ft. wide and from 4 to 8 ft. deep. Nothing like it has occurred since 1862. To-day two Chinamen attempted to cross it, but they were swept away by the rapid current. One was saved, but the other was drowned."

RAILROAD LAW.

The Massachusetts Commission on the Rights of Expressmen.

The Massachusetts Railroad Commissioners have rendered their decision on the petition of Merrill & Co.'s express for additional facilities on the Boston & Lowell Railroad. After commenting upon the jurisdiction of the board in the matter, the demands that can be made upon a railroad corporation as a common carrier, the difference between the provisions for the transportation of freight and express matter as required by law, and the extent of the obligation on the part of railroads to furnish express facilities, the board takes the case submitted to it for consideration, and says: "The question is this: When a firm desires to do business with four towns for a moderate sum is it reasonable to demand that they shall extend their traffic to all points on the Boston & Lowell road and its branches, and pay over $30,000 for the privilege, as is required by the respondents, in order, as they assert, to perfect the prior contract with the United States & Canada Co.? The right is to have reasonable terms. The terms demanded are unreasonable. The price is in itself unreasonable. If $30,000 is a fair price for an exclusive right it is an excessive price for a right shared with another company. And it is unreasonable to impose as terms upon a firm wishing to do a limited business, the requirement that they shall undertake a business wholly different in extent, which they do not desire, and which they may not have means to carry on. In short, the proposal is an ingenious evasion of the law, but it is no less an evasion.

"It is said that this will lead to two kinds of inconvenience—difficulty to the railroad company from the multiplicity of expenses and number of baggage-cars, and evil to the community from reckless competition, ending in consolidation and in higher rates. To these suggestions there are several answers. (1.) The Legislature, when it re enacted the common law requiring carriers by rail to give transportation to all and reasonable terms to all, probably foresaw possible evils, but it deemed monopoly a greater evil than any that was likely to result from competition. It also hoped that common prudence and common sense would check such a multiplication of expenses as would greatly encumber and endanger the operation of trains; and it has believed that whatever might be the temporary losses to competing express lines the community would, on the whole, be more cheaply and more liberally served than by a more restricted policy. (2.) In theory our view may result in too many expresses on any route. But in theory the respondents' ideas will cause wider competion and greater confusion. The board holds that a contract Tan express over a whole line opens it for local expresses.for he respondents contend that each new applicant must take the whole line, and compete for the whole business.

"They expressly admit that the right of the fiftieth is as good as that of the second. Thus in theory the respondents' view leads to far more inconvenience than ours. In practice there will be probably much less in either case than is imagined. Finally, on this point, if the law requires the action asked, it is to be had without regard to consequence.

"Even if we did not take this view of the law, we should be strongly inclined to think that upon the petition of a second express company, and of a large portion of the people in any Massachusetts town, it would be our duty to recommend to the railroad corporation that it should allow the express company to furnish the community with the accommodation which it desired. But it is not necessary to consider this point, nor to inquire how it is affected by the fact that the petitioners in aid are all from New Hampshire. Acting under the statute, the board recommends to the Boston & Lowell Railroad Co. to comply with the request of Messrs. Merrill & Co. by granting them substantially the facilities asked upon the payment of a reasonable price for the service performed."

Duties and Liabilities of Trustees.

An opinion of the United States Circuit Court was filed by Judge Butler yesterday in the suit of Sulzbach Bros., German bankers, against the estate of J. Edgar Thomson, Andrew Carnegie and others. The decision was in favor of the complainants against the Thomson estate, but the bill, so far as Carnegie was concerned, was dismissed, the Court being of the opinion that he was not responsible for the acts complained of. Three important questions were considered by the Court: first, as to the duties of the Trustees of the Davenport & St. Paul Railroad & Construction Co., of whom Mr. Thomson was one; second, as to the performance of those duties; and third, as to the loss resulting from their non-performance.

The duties of the Trustees, it was said, were to certify bonds at the rate of $20,000 per mile of the road on which grading, bridging and tieing had been completed. "The duty," continued the opinion, "was delicate and important, and on its faithful and intelligent performance the safety of the bondholders largely depended."

It was then stated that the Sulzbach Bros. paid over $3,000,000 on certificates issued by the trustees, showing that the road had been sufficiently completed between the points of Davenport and St. Paul to warrant the issue. The Engineer of the company, it was said, certified to the trustees that 100 miles had been completed, in addition to 50 miles graded, bridged and tied. The estimate, however, included sidings and the Maquoketa Branch, "which branch," the Court said, "was not to be included in the estimate for bonds."

"Mr. Thompson had, and must be charged with, full knowledge of these terms and their signification," said the Court. "If he had inquired of the Engineer respecting the measurement and been informed that it did not affect the branch and sidings, he would have been justified in relying upon it; but with the knowledge that it did not embrace sidings, and that it might, and probably did, embrace branches (for the grading clause of the mortgage specified branches), he accepted it without question. In this he clearly fell short of his duty, and was therefore guilty of negligence. In the investment of his own property, and especially of so large an amount, it cannot be believed he would have so acted."

The opinion then referred to the great responsibilities of trustees and the care which should be taken to guard against the interests of the *cestui que trust*, and continued: "The trustees failed in duty respecting a part of the bonds sold to Sulzbach Bros., and must be held accountable for the injury thus inflicted."

"While the certification of these bonds was of itself care less and improper," added the Court, "the act of handing them over virtually to the construction company, by whose President $491,000 were immediately appropriated to its own use, was most reprehensible."

It was then said that, although at this time Mr. Thomson was abroad, the acts were performed through his agent, and he was, therefore, responsible.

The opinion further stated that the safety of the road depended on the ability of the construction company which was formed to complete it. "For the construction company's failure," it said, "the trustees are not accountable. They are responsible simply for the loss which has resulted through their failure to withhold certificates until the work authorizing them had been performed. In other words, the bondholders can justly claim no more than to be placed in the position they would have occupied if the trustees had discharged their duty in this respect. Bonds were issued sufficient to cover 175 miles of the road.

"If the trustees had discharged their duties it may therefore properly be assumed that the road would have been ironed and equipped for this distance. It must also be considered that the road would have been encumbered with mechanics' liens under which it was sold and for which the trustees were not responsible."

The Court then held that if it could be ascertained what the road thus equipped would have been worth as security for the bonds and how much less the value was, there being 50 miles short, it could be determined precisely what the complainants lost by the trustees' failure of duty.

It was therefore decided to refer the matter to a Master to ascertain by the testimony of persons familiar with the bonds of the road and by other means the damages coming to the complainants.—*Philadelphia Ledger, Feb. 13.*

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

DECREASE IN PROFITS ON THROUGH FREIGHT FROM THE WEST.

The New York, Chicago & St. Louis and the Chicago & Atlantic railroads entered the Chicago pool July 1, and we have now complete returns of the through shipments by all the existing railroads from Chicago to the East for the last half of the year, and for all the other railroads—that is, for all that then existed—for four years previous. It will be interesting to see what has been the course of the through shipments, and the earnings and profits from them, of this great traffic centre, which seemed such a mine of wealth that three new railroads have been built to it since 1879, the chief object of which, undisputably, was to secure a share of its through traffic. As two of the roads were open but part of the time in the first half of 1883, in what follows we have compared traffic, earnings and profits for the last half of the year only; but we will first state the total number of tons shipped for the whole year, correcting the pool reports by adding the shipments by the two roads in the first half of last year as reported to the Chicago Board of Trade, which are not quite accurately given in those reports, but will not vary much from the truth. The yearly shipments in tons have been:

1879.	1880.	1881.	1882.	1883.
2,471,728	2,309,640	2,889,317	2,129,989	2,402,468

Thus the shipments last year, though 12¾ per cent. more than in 1882, were a little less than in 1879, and but 4 per cent. more than in 1880, and were 17 per cent. less than in 1881, when the railroad war made them large.

In the last half of the year (when we have reports from the new as well as the old roads for 1883) the shipments were:

1879	1880.	1881.	1882.	1883.
983,596	1,125,061	1,519,781	1,033,831	1,141,733

This is the after-harvest period, though July properly belongs to the old crop-year. This makes a more favorable showing than the shipments for the whole year. The shipments in the latter half of last year were larger than those in the corresponding half of any previous year except 1881, when low rates made the whole business valueless and caused the railroads to carry much of what usually goes by lake. The increase over 1880, when rates were well maintained, and there were but six roads instead of the eight now carrying from Chicago, is but 1¼ per cent., however, and the increase over 1882, when also there were but six roads and the rates were much more generally maintained than they were in the last half of 1883, is 10½ per cent. Deducting the 19 per cent. which has been awarded to the new roads, there remain 924,803 tons for the six railroads that carried 1,033,831 tons in 1882, 1,519,781 in 1881, and 1,125,061 tons in 1880; and deducting another 11 per cent. for the Chicago & Grand Trunk, there remain 799,213 tons for the five roads which carried 983,596 tons in the corresponding half of 1879. Thus for the old roads the amount of through Chicago shipments was much less in the last half of last year than in the corresponding period of any of the four years previous—10½ per cent. less than in 1882, 39 per cent. less than in 1881, 18 per cent. less than in 1880, and 18½ per cent. less than in 1879.

If we consider *the value* of the traffic, the decrease is still greater, though we cannot tell how much greater, because we have no means of knowing *how much* of the freight was carried last year below the regular rates; but as the cuts seem to have been limited chiefly to one company in the first three months, they were probably not very great, as a slight rebate is sufficient to attract large shipments, if it is not met by competitors. In December—in the last half of it, at least—cutting was more general, but altogether these irregular reductions, which have probably ranged from 2 to 10 cents per 100 lbs., but on most of the shipments taken below rates were probably less than 5 cents, cannot have greatly reduced the total receipts from the Chicago shipments. If the average cut was as much as 5 cents per 100 lbs., and cuts were made on one-third of the total shipments, which seems a very large allowance, the *average* reduction on the total shipments was 33⅓ cents per ton, or 1⅔ cents per 100 lbs., which is 6½ per cent. of the summer and fall rate, and 5⅓ per cent. of the winter rate, and amounted to $380,578 for the six months, when the total earnings should have been $5,634,264. If we make this reduction, we shall have the following as the gross receipts from the Chicago through shipments in the last half of the past five years, assuming that they all went through to New York.

1879.	1880.	1881.	1882.	1883.
$6,170,314	$7,048,753	$4,255,387	$5,449,306	$5,253,686

Thus the total earnings from the Chicago business in the last half of the year were less in 1883 than in any other of the five years except 1881, but nearly a million *more* than in that year.

Assuming that all over 15 cents per 100 lbs. is profit, the *net returns* of the Chicago shipments have been:

1879.	1880.	1881.	1882.	1883.
$3,219,526	$3,673,573	(Loss) $303,956	$2,347,815	$1,828,487

Thus, on this assumption of cost, the traffic in the last half of last year yielded but half as much as in 1880 and 43 per cent. less than in 1879. It was about this time of extraordinary profits that so many new lines were begun or planned to secure a share of the through traffic, not from Chicago only, but also elsewhere between the West and the East. It was not only, however, because this traffic was then so large and profitable that so many new lines were then designed, but also because this traffic had been growing with great rapidity. The above figures do not go back far enough to show it, but the Board of Trade reports of the total shipments of some leading articles from Chicago will, as follows:

	Flour and grain, bu.	Hog products, tons.	Cattle, No.	Hogs, No.	Flour, tons.
1875...	72,369,174	270,250	696,534	1,736,166	228,511
1876...	87,241,306	334,637	797,724	1,211,289	263,484
1877...	90,706,076	343,109	703,402	1,045,839	248,230
1878...	118,675,469	530,434	699,108	1,292,945	277,964
1879...	125,528,379	578,751	726,903	1,732,385	309,054
1880...	154,377,115	682,490	886,614	1,428,184	286,274

From 1877 to 1880, thus, there had been an increase in shipments amounting to 70 per cent. in grain and flour, 99 per cent. in hog products, 26 per cent. in cattle, and 37 per cent. in hogs. As the grain mostly went by lake, we may omit that wholly, and note only the increase of 16 per cent. in flour shipments; but actually there was a very large increase in the shipments of grain by rail, and in the last half of 1879 it first began to seem probable that remunerative rates could be secured for this and other shipments eastward. This was partly the effect of a better co-operation of the railroads, but chiefly, so far as this traffic is concerned, the natural result of the very rapid and unexpected growth of the business, making the demand for transportation temporarily exceed the supply, and so actually forcing rates up. The traffic had been substantially without any profit in 1876, and it yielded but little in 1877, and not very much in 1878, rates being demoralized in all the winters and throughout 1876, and also in the first half of 1879. But the pressure of traffic after harvest made it possible to establish and maintain an advance of the grain rate from 25 to 30 cents Aug. 25, to 35 cents Oct. 13, and to 40 cents Nov. 10, while now shipments are light at a 30-cent winter rate even when it is badly cut.

Now the effect of the sudden and rapid growth of traffic from Chicago, together with such an advance in the actual rates received as must have trebled or quadrupled the *profit* on the business, we see in the multiplication of lines between the West and the seaboard—in the Nickel Plate and the Chicago & Atlantic, the Lackawanna extension and the West Shore, the extensions of the Lake Erie & Western and the Indiana, Bloomington & Western, and various other lines which have been built of late years largely to secure some share of a through traffic which had never ceased growing, but suddenly began to grow rapidly, and which from being productive of very little profit, became largely profitable.

But hardly were the new lines fairly begun when the rapid growth of through traffic ceased, and now that they are done the total traffic seems to be no more than when they were begun and shows no signs of rapid growth for the present, while the rates which it is possible to collect, even when the co-operation of the railroads is most complete, have fallen so low that the total profits on the business are very much less than in 1879 and 1880. Take out the 30 per cent. which the three new roads get, and (for the last half of the year) $1,280,000 of profit from through freight exclusive of live stock remains for the five roads which made $3,219,500 in 1879, and after allowing for the 19 per cent. which the two newest roads got, the six others got $1,481,000 last year against $3,673,500 in 1880, a loss of $304,000 in 1881, and a profit of $2,348,000 in 1882. In future calculations of the profits which a new competitor may secure in an old field, it will be well to estimate the future course of rates. What seems a small reduction in the rate may make an enormous reduction in the profit. At the assumed expense of 15 cents per 100 lbs. from Chicago to New York, considerable freight has been taken this year which yields but *one-fifth* the profit realized throughout the winter of 1879-80; at the regular rate this winter the profit is but $3 per ton, against $5 then; and whether the expense is as assumed or not (and we do not assume that this is the whole of the expense properly chargeable to the through freight, but only the *addition* to the expenses caused by carrying through freight—a very different and much smaller sum), *the amount* of reduction in profits is as stated, unless expenses have changed, and if expenses have changed since 1880 they have increased.

The fact is, the normal condition of things makes the through traffic between the East and the West yield very little profit, meaning by the normal condition that existing when the several carriers have estimated properly what they will have to carry and provided means for handling it—vessels, cars and motive power—and when there is the usual competition between the railroads and the water routes. It is an abnormal condition of things that makes this business very profitable, as it was for about two years ending with June, 1881. No possible combination of railroads can make the through rates as profitable as the average local rates, except for short periods. When they have been very profitable for a year or more, the lake, canal and river vessels multiply and force down the rates, even if there is no new railroad competition; and if new railroads are built to secure a share of the large profits, by the time they are done there are no large profits to share.

It is not always the new roads that suffer most, however. In every case but one since 1870 the new roads built to Chicago from the East have been built by or in the interest of an Eastern trunk line to secure an independent connection with the greatest of interior traffic centres. Aside from the profit on the new line, there was that to be made on the old system, and the advantage of a good connection for traffic not through, and the influence gained by having a footing at the chief source of traffic supply of powerful competitors, who would be much more considerate when they knew that their rival could ruin the value of a very large amount of their traffic. And so far, the roads built to Chicago have not fared so badly. The Baltimore & Ohio line for some years did not earn the interest on its cost directly, but it doubtless then increased the profits of the other lines considerably; the Chicago & Grand Trunk secured an important traffic almost immediately, and earned gross $8,800 per mile last year. The two new roads have not been open long enough to make a report yet, but the Chicago & Atlantic has a share of the through shipments from Chicago not much below the average of the eight roads. But the better the new roads do, the worse is it for the old ones. Without doubt the traffic has not increased, and without doubt the profits on it have materially decreased, and the part of the profits which the old roads get is very much less than it was a few years ago.

STRAINS ON COUPLING-RODS AT HIGH SPEED.

The increase in the speed of passenger trains has necessitated the use of more powerful engines, and as an engine has not only to exert more power to draw the faster train, but must also exert that greater power within a shorter space of time, it follows that the steaming powers of an engine are even more severely tried than its capacity for pulling. No very complete or satisfactory experiments exist as to the resistance of modern express trains at high speed, but a variety of experiments concur in showing that the resistance does not increase perceptibly up to 25 miles an hour, and that after that speed the resistance increases at a

somewhat smaller ratio than the square of the speed. It is sufficient for our present purpose to know that it does increase.

An increase of boiler power demands a larger grate and fire-box, which can only be obtained by spreading the drivers, or by placing the fire-box above the frame, or even taking, like Mr. Wootten, a step further, and placing it wholly above the wheels. As but few master mechanics have yet resorted to these expedients, but still retain the fire-box in its usual position, it is evident that it can only be enlarged by increasing the distance between the drivers. This adds to the length of the coupling-rods, and consequently to the risk of breakage, and it becomes a question as to what length a coupling-rod can be made with safety, and the best and cheapest method of obtaining a long and reliable coupling-rod.

The most obvious method of strengthening a coupling rod is to enlarge its cross section by putting more metal in it; but there are objections to thus increasing the weight of the rod.

It is important that a coupling-rod should not be too heavy, for several reasons which tell with special force in a high speed engine. As the greater part of the rod has a reciprocating motion it cannot be actually balanced by any simple method, such as a weight in the rim of the wheel, which, having a revolving motion, can only properly balance parts having a similar movement, the reciprocating parts being balanced imperfectly, or, in other words, at one or two points only of their period of motion. This is evident when we consider that revolution is an even unchanged motion, while a reciprocating motion changes its speed and direction at every stroke of the engine.

The effort to balance imperfectly 100 lbs. of extra weight in the coupling-rods entails an addition of 30 or 40 lbs. to the balance weight. Any addition to the balance weights must be placed nearer the hub of the wheel, and therefore act with decreased leverage. Thus the addition of 50 lbs. to one coupling-rod entails the increase to the weight of the engine of some 140 lbs., which, being imperfectly balanced, adds to the oscillation and general unsteadiness of the engine at high speed.

If the increase in weight is also accompanied by an increase in the cross section of the rod, it will require a greater strain to stretch or compress the rod a given distance, and hence, if the distance between the centres of the driving axles be lengthened, owing to one wheel sinking and the other rising, the corresponding alteration in the length of the coupling-rod will strain the crank-pins, driving boxes, etc., in proportion as the large section of the coupling-rod refuses to stretch or compress.

To arrive at some understanding on this question, it is well to endeavor to ascertain the amount of the principal strains to which a coupling-rod is exposed. The careful consideration of these strains may assist us in determining the real causes of the numerous fractures of coupling-rods, and the causes once known the remedies can easily be applied.

All coupling-rods are liable to strains arising from imperfect adjustment of their length, or from variations in the distance between the centres of the drivers caused by the wheels standing on an uneven surface, or by the expansion of the main frames, caused by the heat of the fire-box. It is manifestly impossible to estimate the strain due to the first-named cause, as the amount of error in the adjustment varies, and its very existence shows that it was unknown to those who had the care of the engine and presumably did their best to have everything right about it.

Assuming, what is quite possible, that one wheel sinks 1 in., and the other rises 1½ in., this will give a difference in level of the crank-pins of nearly 3 in., and increase the distance between them on a 9-ft. driving-wheel base by $\frac{1}{25}$ of an inch. If, at the same time, owing to the legitimate strain on the rod, all the working surfaces are in close contact, the rod will be lengthened $\frac{1}{1700}$ part of its length. A tensile or compressive strain of 1,000 lbs. per square inch alters the length of a bar of good wrought iron or Bessemer steel by about $\frac{1}{30000}$ of its length, and therefore the difference in level of the two crank-pins puts a strain of $\frac{30000}{1700} \times 1{,}000$ lbs., or 11,000 lbs. per square inch tension upon the rod. As this strain is solely due to the difference in level of the crank-pins, it cannot be diminished by increasing the cross-section of the rod, which would only increase the total amount of the strain. The bending of the crank-pins and the compression of the frames tend, however, to reduce the strain, though it is difficult to say to what amount.

If, however, so small an error as $\frac{1}{25}$ inch produces so large a strain upon the rod, what must be the effect of improper adjustment of the length of the coupling-rod, aggavated by the expansion of the frames from the heat of the fire-box? These sources of error can only be partly guarded against; and, as they apply to all classes of engines, and do not apply more to fast passenger than to other engines, it is evident that the main cause of coupling-rods breaking at high speed must be sought for elsewhere. It is possibly to be found in the rapid and variable motion of the coupling-rods.

The motion of a coupling-rod is somewhat complex. The crank-pin and any point in a coupling-rod describes a cycloidal curve in the air, an undulating, wave-like line, the height of the waves from trough to crest being equal to the stroke of the piston, and the length being equal to the circumference of the drivers. The path through the air is thus continuously forward in the direction in which the engine is running, and hence the reversal of motion in a backward and forward direction only exists in relation to the engine itself. Taking the ground as a standpoint, the coupling-rod at every point in its path is always moving forward. The velocity, however, of this motion changes, but not to an important extent, and it is evident that the inertia of the weight of the rod that resists these compulsory changes of speed in a forward direction can only strain the rod in the direction of its length.

When the vertical movement of the rod is considered a totally different state of things is found to exist. The vertical motion of the rod ceases when the crank-pin gains its highest position, and attains a maximum when the line joining the crank-pin and axle centres is horizontal, and diminishes to nothing when the crank-pin is in its lowest position. The motion is then reversed and the crank rises, attaining a maximum velocity when the centre line of the throw is horizontal, and coming to a state of rest, considered solely in relation to its vertical motion, at the top of the stroke.

Taking an engine with 24 in. stroke and 68 in. drivers, running at 50 miles an hour, the coupling-rod attains a velocity in a vertical direction at the rate of 17¾ miles an hour every time the piston is at either end of the stroke. As this occurs twice every revolution, and as an engine with the above size of drivers makes 247 revolutions per minute at 50 miles an hour, each coupling-rod (considering its vertical movements only) attains a speed of 17¾ miles an hour, and comes to rest again 494 times a minute. These are rather startling figures, which tend to produce wonder at the infrequent breakage of coupling-rods on fast engines.

To attain this velocity of 17¾ miles an hour, or 26 ft. per second, the coupling-rod would require to fall freely through over 10 ft., according to the well-known formula $V = \sigma \sqrt{h}$, when V is the velocity in feet per second, and h is the distance through which a body would have to fall freely to attain that velocity. In this case h equals 10.56 ft., so that the coupling-rod should have an uninterrupted fall of over 10 ft. in which to acquire its maximum speed without incurring any internal strain. But it can only fall 1 foot instead of 10.56 ft.; that is to say, it falls 1 foot from its highest position, where the vertical velocity is *nil*, to a point where a line through the centres of axle and crank-pin is horizontal, where the vertical velocity is at a maximum. It is therefore evident that a force 10.56 times as great as the weight of the rod is required to give it this speed. Putting it in the form of an equation:

10.56 ft. fall × wt. of rod = 10.56 × wt. of rod × 1 ft. fall,

the number of foot-pounds on each side of the equation being the same.

It therefore appears that, disregarding the strains thrown upon a coupling-rod by the tractive force of the engine, the expansion of the frames, and the defective adjustment of the length of the rod, the mere fact of the rod being whirled through the air with a motion incessantly changing in direction throws a cross-breaking strain on the rod equal to a distributed load some 10½ times the weight of the rod itself.

Taking, as an example, a rod 108 in. long between centres, weighing 200 lbs., and having a cross-section equal to 6 square inches, the plain part of the rod measuring 3½ × 1¾ in., the strain thus thrown upon the rod, considered as a girder, will be 8,120 lbs. per square inch. This of itself would probably be insufficient to break the rod, even if the strain were constantly applied and taken off many million times. But when, in addition to this, the legitimate strain due to the tractive power of the engine, and other possible strains due to expansion, rough road, etc., are added, the elasticity of the rod becomes overstrained, and a few hundred thousand applications of the strain might break the rod. Taking the cylinder at 18 in. diameter, and assuming an average pressure on the piston of 50 lbs. to the square inch, the whole average pressure on each piston will be 12,700 lbs., and assuming that the whole strain of this occasionally comes on the coupling-rod, we have an additional strain of 2,000 lbs. per square inch upon it, making in all 10,220 lbs. per square inch. Any additional strains thrown on this rod by the inequalities of the road and other causes that have been previously mentioned will probably lead to its ultimate fracture.

Similarly we may endeavor to find the strains upon a rod of the same weight, the parallel part being of the same area in square inches, but the section being arranged in the form of an I. Taking such a rod, 6 in. deep, having a web ½ in. thick, and the top and bottom flanges (answering to the chords in a girder), each measuring 2½ in. × ¾ in., we find that the same cross-breaking load only produces a tensile or compressive strain on the top and bottom chords of the rod of 4,100 lbs., or little more than half the strain caused by the same action on the rectangular section. It would thus appear that the I section rod is less strained to the extent of 4,000 lbs. to the square inch, and as it is difficult to see in what respect it can be more strained than its less scientifically shaped rival, it would certainly always appear to have a reserve of strength to the extent of 4,000 lbs. to the square inch as compared with the rectangular section rod.

The strains on these coupling-rods have been investigated at a speed of 50 miles an hour, which most fast trains will attain as a matter of course for many miles of their daily journey. But it is within the bounds of possibility that an engine which is accustomed to take a heavy train at that speed may be called upon to run its hardest with a special car, or be hurried along in some pressing emergency down grade at the rate of even 75 miles an hour. What shape does the problem now assume? The strain thrown on the rod by its changing speed is equal to 23.52 times its own weight, and therefore the rod has to bear a strain equivalent to a distributed load of 4,700 lbs. This would strain the rectangular rod to the extent of 18,000 lbs. per square inch, which is certainly above the limits of safety, when it is borne in mind that this strain is applied and taken off 741 times in a minute, and that the direction of the strain is continually reversed. The strain itself is applied in $\frac{1}{12}$ of a second, so that it is somewhat difficult to distinguish it from a blow. On the channeled section coupling-rod, the strain per square inch under the same conditions would be only 10,500 lbs., which is a marked difference, and shows that at this high speed the channeled section rod has a reserve of strength of 7,500 lbs. per square inch, which is a considerable factor.

The fair working strain, however, that might be reasonably expected on this rod at such a high speed is therefore not less than 13,000 lbs. to the square inch, and though this strain would probably last but for a short period, its frequent repetition, or the addition of any unusual strain from the roughness of the road, etc., would certainly break the rod sooner or later. It is, however, possible to have a still stronger section with the same weight of metal, 60 lbs. to the yard. Taking a rod 7¼ in. deep, having top and bottom flanges or chords measuring 3 in. wide by ½ in. thick, and a web ⅜ in. thick, we retain the same cross section, 6 sq. in., and the same proportion between the relative sections of web and flange; but the effective depth of the girder is considerably increased, with the result that at 75 miles an hour the strain is reduced from 18,000 lbs. per square inch in the rectangular section rod, and 10,500 lbs. per square inch in the 6-inch channeled rod, to 8,320 lbs. per square inch tensile or compressive strain in the 7¼ in. channeled rod, or virtually the same strain that is thrown on the plain rectangular rod at 50 miles an hour. As the excessive speed of 75 miles an hour is likely to be seldom, if ever, attained, and then only on a tolerably straight stretch in good order, it is fair to estimate the additional strains on the rod will be less at 75 miles an hour than at 50 miles an hour, especially as the maximum tractive power of any locomotive is considerably reduced at the higher speed by the consequent throttling and wire-drawing of the steam.

This investigation certainly would seem to indicate that a long coupling-rod for a high-speed engine should be kept as light as possible, and that its principal strains at a high speed probably are caused by its own weight, or by faulty adjustment of length. As an I or girder form is best calculated to stand the cross-breaking strain attendant on high speeds, and resists the tensile or compressive strain due to the tractive power of the engine as well as any other form, it would certainly appear desirable to adopt it. Errors in adjusting the lengths of coupling-rods may be, of course, to a great extent avoided by the use of bush-ends, and

the evils resulting from the changing distance between the crank-pins, due to the expansion of the frames, wheels sinking and rising over a rough road, etc., may be neutralized (as they cannot be prevented) by making the coupling-rod bushes or brasses a loose fit on the pins.

Railroads with Light Winter Earnings.

The Canadian Pacific has extremely light earnings in January, gaining but 37 per cent. over last year, while its mileage was 68 per cent. greater; thus its earnings per mile fell from $164 to $133½—and were very small both years. The great effect that the winter has on this road may be traced below, where the earnings for the five months ending with January are given:

Year.	Sept.	Oct.	Nov.	Dec	Jan.
1883-84.....	$489.122	$609,000	$498,000	$320,000	$259,000
1882-83.... ...	274,257	301,000	287,000	231,000	189,000

The decrease, we see, is very much greater this year than last, the receipts being $350,000 (57½ per cent.) less in January than in October this year, while last year they were but $112,000 (37 per cent.) less.

The Northern Pacific also makes a very bad showing for January, *as compared with previous months*, for the comparison with last year is not unfavorable. With 60 per cent. more road than last year, it earned 45¼ per cent. more money, and its earnings per mile fell only from $252 to $231. But the earnings were but half as great in January as in December, and for successive months they have been:

	Sept	Oct.	Nov.	Dec.	Jan
1883-84....	$1,210.000	$1,324.000	$1,220,300	$1,166,652	$565,500
1882-83....	772,838	8 9,831	751,633	531.098	387,928
1881-82....	506 032	570,724	47 ,611	391,286	245,369
1880-81....	339,217	358,458	300,822	220,993	1 6,508

The great decrease from previous months last January is therefore remarkable only because it came so suddenly, or, rather, what is remarkable is that receipts were so very large in December, not that they were so small in January. Compared with the previous October, which has been the month of largest earnings in all these years, the January earnings were 57 per cent. less this year, 53 per cent less last year, 57 per cent. less in 1882, and 68 per cent. in 1881.

Seven months of the Northern Pacific's fiscal year have now expired, and we may call to mind the estimate of the gross and net earnings, said to be "official," issued last September, which put them at $15,000,000 gross and $6,000,000 net. For these seven months the gross earnings have been:

	1883-84.	1882-83.	Increase	P.c.
July to Jan.....	$7,420,316	$4,694,611	$2,725,705	58.0

In 1882-83 59¼ per cent. of the total earnings of the fiscal year were in these seven months. Should that be the case this year, the amount for the twelve months ending with June will be about $12,420,000. To reach $15,000,000, the gross earnings for the five months ending with June must average $1,516,000 per month, which is $192,000 more than the road earned last October, which is so far the month of largest earnings. The earnings of this road have always been much larger in the last half than in the first half of the calendar year; but of late this has been partly due to the fact that large extensions were made every summer, so that a much larger mileage was worked in the fall than in the spring, which will not be true to the same extent this year. Still under normal circumstances the road is likely always to have larger earnings in the last half of the calendar year, as is very strongly indicated by the fact that in the last half of 1882 they were 24 per cent. greater than in the first half of 1883. And this has been the case generally, as we shall see by comparing the earnings in the first and last half of the *fiscal* year, that is, the earnings in each July to December half-year with those in the *following* January to June half-year, as we do below:

Fiscal year.	December half.	June half.	Fiscal year.	P.c. in June half.
1879-80...	$1 285 787	$934,799	$2,220,586	42.1
1880-81.....	1.695,285	1,299,240	2.994,525	43.4
1881-82.....	2,770.914	2,659,316	5,430,3 0	49.0
1882-83.....	4,306,683	3,475,758	7,782.441	44.7
1883-84.....	6,854,816	.....	.....	....

The crops in the Northern Pacific country are chiefly marketed in the fall months, there being no corn there to be shipped in the spring and summer. The traffic in the June half-year of late has been very greatly affected by the immigration, and it will be also the coming spring. It can hardly be expected that there will be as large an immigration to the country along its Dakota line as there has been in some previous years, when it was enormous, because the very choice places which have caused the rush thither must be largely in the possession of individuals now, as the road has been open for ten years across Dakota, and there has been a very large immigration thither for some four years. But the road now, for the first time, gives immigrants access to the new country in Eastern Oregon and Washington, which has been growing so fast of late, as well as to a vast area in Montana and Idaho, and emmigrants from the East to these distant countries will give the road larger earnings than those to the comparatively near Dakota country. What the prospects for this immigration are we have no means of judging. Should it be heavy, or should there be a rush to the new Cœur d'Alène mining district in Idaho, it would contribute very largely to the earnings of the road, as those who remember the earnings of the Denver, South Park & Pacific for a year or so after it was opened to Leadville may easily believe. Further, this is the first year of the road's through traffic, and we have yet to learn how far that will affect the earnings in the June half of the year, which includes the season for canning salmon—a staple which is likely to contribute more through freight to the Northern Pacific than any other one thing for the present. But though the salmon are caught and canned in the first half of the year, they may not all be shipped then.

Very light earnings in winter are characteristic of the railroads northwest of St. Paul, where winter puts an end to industry much more completely than in almost any other part of this country; but on the other side of the Rocky Mountains this is not true, the winters there being less severe than on this coast. For the lines in the northern half of Minnesota and Dakota, in Manitoba and the Northwest provinces of Canada, and probably also in Montana, it is true. The St. Paul, Minneapolis & Manitoba affords another instance, its lines all being in the northern part of Minnesota and Dakota, and having had the following earnings in the five months ending with January for the last four years, during which the mileage has been increased rapidly:

	Sept.	Oct.	Nov.	Dec.	Jan.
1883-84.....	$777,808	$916,882	$845,514	$699,489	$449,304
1882-83.....	832,776	979,057	913,335	753,515	489,763
1881-82.....	485,736	605,708	508,530	528,263	395,461
1880-81.....	274,188	345,057	300,675	297,640	254,187

For the last two years its January earnings have been about one half of the earnings of the previous October. Possibly this may change hereafter, as the population on the Canadian Pacific increases; for this population can find an outlet in winter only over the St. Paul & Manitoba road, while when navigation is open the route by way of Port Arthur and the lakes will carry most of the grain and probably most of the merchandise also.

Another of these "hibernating" railroads, as we have called them, is the St. Paul & Duluth, whose earnings in successive months have been:

	Sept.	Oct.	Nov.	Dec.	Jan.
1883-84.....	$131,681	$161.950	$133,824	$94.404	$72,768
1882-83. ...	120,214	146,023	124,9 9	92,873	71,461
1881-82.. ..	65,095	73,688	78,282	76.779	65,562

The earnings of this road were extremely light previous to 1881, averaging but $61,053 per month, and then apparently were as much in the winter as in the fall; but for the last two years it has earned twice as much in October as in the following January.

We must, therefore, not be surprised when we find the earnings of roads situated like these shrink very rapidly after the fall months. Not much in the way of work is done or attempted in the prairie country of these high latitudes. The wheat, which is the only crop marketed in any quantity, is mostly shipped before winter; building is not to be thought of, and lumber receipts are therefore light; fuel is likely to be laid in before winter, when the farmers are carrying their wheat to the stations and can haul coal and wood back without making a special journey; immigrants and their supplies move in the spring and summer.

Chicago, Burlington & Quincy Earnings and Expenses.

The Chicago, Burlington & Quincy, which has shown enormous increases in earnings for most months in 1883, reports a comparatively trifling one in December, amounting to but 7 per cent., while the large increase of 13 per cent. in net earnings caused a decrease of $94,628 (7½ per cent.) in net earnings. This, however, is not because the expenses were exceptionally large last December, but because they were exceptionally small the previous year in that month. The average expenses of the 11 months previous in 1882 had been $902,520 per month; in December the expenses were but $760,242; in 1883 they were $999,128 in December against an average of $1,071,045 in the other eleven months of the year. For eight successive years its earnings and expenses in December have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1876.....	$826,120	$705,548	$120,572
1877.....	962,148	615,069	347.079
1878.....	1,070,525	562.156	508,369
1879.....	1,438.167	538,442	899.725
1880	1,552,018	681,412	870.606
1881..	1,905,490	871.199	1,034,291
1882.....	2.027,060	760 642	1,266,418
1883....	2,170,918	999,128	1,171,790

The decrease of earnings since the fall months is unusually great. In 1882 the largest earnings of any month in the year were $2,270,444 (in October), and the December earnings were $243,384 less; in 1881 the December earnings were $382.744 less than the October earnings; in 1880 they were $297,823 less; but in 1883 the largest earnings (September) were $738,243 more than the December earnings. For successive months the earnings in 1883 have been:

July	$1.824.705	October.....	$2,742,479
August.....	2.495,123	November....	2.5[illegible]2,53
September.....	2,909,165	December.....	2.170,918

This exceptional decrease in December was common in 1883, but in the case of the Chicago, Burlington & Quincy it is exceptionally large because its earnings for four months previous had been altogether unprecedented.

For the past eight years the average mileage worked, gross and net earnings and working expenses of this road have been:

	Miles.	Gross earnings.	Expenses.	Net. earnings.
1876.....	1,339	$12.003,957	$6,475,252	$5,528,699
1877.....	1,620½	12 53[illegible],876	6,851,155	5,679,721
1878.....	1,624	14.113,503	7.533,135	6,580 368
1879.....	1,783½	14,779,716	7,928,223	6,851,493
1880	2,511¾	20,454.494	9,362.904	11,091,590
1881.....	2,822	21,176,454	10,574.361	10,602,095
1882.....	3,099½	21,550,805	10,668,341	10.882,464
1883.....	3,235	26,110,369	12,780,630	13.329,739

Thus the gross earnings, which had grown but very little after the acquisition of the Nebraska system in 1880, notwithstanding an increase of more than 20 per cent. in mileage worked, last year made up for lost time, and were then no less than $4,559,564 (21 per cent.) more than in 1882, and 28 per cent. more than in 1880. The working expenses have increased in about the same proportion over 1882, but were 35½ per cent. more than in 1880 (when they were exceptionally light), and the net earnings last year were $2,447,275 (22½ per cent.) more than in 1882, 26 per cent. more than in 1881, and 20 per cent. more than in 1880, heretofore the year of largest earnings.

In 1882 interest and the 8 per cent. dividend required a little more than $8,900,000 of the net earnings of this company; and taxes, some rentals of tracks (not included in working expenses), and payments into the sinking funds absorbed substantially all the remainder. As there was an increase of over $14,000,000 in the capital stock during 1882, on which dividends were paid only part of the year, and also a considerable increase of the funded debt, a considerable increase in net earnings was required in 1883 in order to keep up the dividends. But the increase on account of dividends was but $550,000, and on account of interest about the same amount, so that the increase in net earnings is about $1,350,000 in excess of the requirements, which is about $1.94 per share of stock. This allows for no receipts from dividends on the Hannibal & St. Joseph stock, for which the company has paid $9.000,000 of its debentures. There were none during 1883, but that company doubtless made some surplus net earnings then, which will go to increase the value of its stock, and therefore of the property of the Burlington company, if it is expended for improving the road. The company has other large investments in the stocks of other companies which pay no dividends, and therefore the result of the working of these roads has considerable effect on its finances; should they be able to pay it dividends equal to the interest on what it has paid for their stocks, it would add largely to the stockholders' income. The amount of the investment is more than $25,000,000 5 per cent on which would give a dividend of $1.60 per share of Chicago, Burlington & Quincy stock.

A Switch Inspection Monitor.

Derailments and collisions resulting from misplaced switches seem to constitute one of the most *permanent* sources from which our monthly accident record draws its supply of "specimens," if not the most prominent, as compared with accidents of other kinds which are usually attended with more exciting circumstances. Every month is sure to show a number of this kind, and, though the casualties are perhaps not numerous as compared with the number resulting from other kinds of accidents, the list seems to be always inviting investigation, from the fact that the *causes* are generally so apparently simple, and, one might suppose, easily remedied by reason of this simplicity. The thousands of accidents which never reach the newspapers because of their comparative insignificance doubtless include a large number of the kind named, and a large proportion of the whole probably concern freight trains only; and yet, of those recorded for November, more than one-half, and of those for December three-fourths, occurred to passenger trains.

The *length of time* intervening between the misplacing of a switch (or the time when it ought to have been set right) and the time an accident occurs is a point which, if it could be illuminated, would doubtless afford some valuable light on this subject, but unfortunately there are no data on it. However, it is

probably safe to say that the interval is comparatively long; that is to say, that when a train encounters an "open switch" the likelihood is that it has been "open" for a considerable period. If this is so it gives additional force to the argument for the necessity of periodical inspection by some person other than the switchman who is actively engaged in the moving of the switches.

It is doubtless true that both the proximate and the remote causes of the negligence which results in these accidents have their origin in a great variety of circumstances, this view finding special favor with the persons who commit the blunders, and who desire to furnish themselves with some plausible and logical explanation of a phenomenon that is quite likely unexplainable except on the general ground of "total depravity," and it is consequently often thought that the remedy must be equally many-sided in order to touch the difficulty. We are inclined to think, however, that the one word "discipline" pretty nearly covers the case. Where our evils start from such a variety of sources that we cannot prevent them, often the next best thing is to station a double force of headsmen and slay them as they make their final attack, it being just as efficacious to kill them then as in their incipiency, provided only that the extinction is certain.

For facing-point switches unprovided with interlocking signals, as thousands must remain for years to come, the best *theory* of protection is, undoubtedly, to provide a switchman to look after the switch and another man to look after the switchman; and this is, in fact, generally the object sought in issuing the usual order that station agents must examine switches a certain number of minutes before the arrival of each train. But not only in the cases where there is only one man at a station, who must, consequently, be his own monitor, but in others as well, this plan fails of effectual execution for the reason that the duty of watching a switchman—or any one else—whose lapses occur only one time out of ten thousand is an exceedingly monotonous and uninteresting one. If the person whose conduct we are watching requires frequent or even occasional correction or advice our task has in it some degree of interest, and we are stimulated to renewed vigilance on every occasion which calls especial attention to the subject; but after looking at a switch several times a day for a long period and finding it always right, the sense of danger is quite likely to be weakened, and the continued carefulness of the switchman induces the monitor unconsciously to lay a part of his own responsibility upon him.

Where a person is disposed to shirk it would perhaps be hard to find a remedy for this difficulty; but for station agents or others who honestly intend to keep a regular watch upon their switches, but find it hard to keep their vigilance up to the sticking point, an excellent mechanical aid is an alarm clock, set to give warning of the hours at which the duty should be attended to.

Mr. B. B. Adams, Jr., station agent of the Boston & Albany road at Westfield, Mass., has in use a novel arrangement of this kind which could be profitably copied in a good many yards. For his office timepiece he has one of J. A. Lakin's "programme clocks," which are arranged to *strike* at intervals of five minutes all day, or to *omit* any one or all of them, as desired, the effect being to provide a warning for any number of irregular occasions during the day. For trains due, say, at 9:30, 10:15, 10:40, 1:05 and 4:10 the clock can be set to strike at 9:20, 10:05, 10:30, 12:55 and 4:00, and at no other time, thus providing an unerring reminder to the agent or clerk in the office to make each required examination of switches at exactly the right time.

Mr. Lakin also furnishes these clocks with electric circuit-closers, so that they can be arranged to warn not only the occupant of the office but also any desired number of switchmen, gate-tenders, or others, by means of a battery, wire and electric bell. Whenever a change in the time-table makes it necessary to set the clock to strike at different hours the alterations can be made in a moment. This arrangement may be the means of making safety doubly sure in thousands of instances where it now depends upon one unaided mind, and thus prevent some of the accidents which result from the tenacious way in which employés of various grades hold to the view that to make safety singly sure, so to speak, is all that is required.

The Reagan bill meets with little favor in Reagan's committee. Mr. Reagan was made Chairman of the Committee of Commerce of the House in this Congress, and it has given much time to propositions for the national regulation of railroads. Mr. Reagan's bill proposes an absolute restriction by law of the rates the railroads may charge. This week the committee voted 13 to 2 against reporting the Reagan bill, and 9 to 6 in favor of reporting a bill for a national railroad commission authorized to investigate, report and recommend—a body which, if properly selected, might do a most useful work.

Erie earnings and expenses are given as follows in the statement for the month of November last:

	1883.	1882.
Earnings	$2,180.981	$1,818 823
Expenses	1,477,903	1,061,618
Net	$703,078	$757,205

As heretofore, what is given as "earnings" this year includes the Erie's share of the New York, Pennsylvania & Ohio earnings under the lease, and the working expenses include *the whole* of its expenses, so that the "net" is the net earnings of the Erie proper plus or minus the profit or loss on the lease. The business in November generally was not nearly so good in 1883 as in 1882, and if the gross receipts of the New York, Pennsylvania & Ohio were also much reduced there may have been a considerable loss on the lease, as in the summer months there was probably a large profit. To make a fair comparison we give below the figures for 1882, for the two roads as they would have been had the New York, Pennsylvania & Ohio been leased by the Erie for 32 per cent. of its gross earnings—that is, we add to the Erie's gross earnings in November, 1882, 68 per cent. of the gross earnings of the leased Ohio road in the same month, and to the Erie's expenses the whole of the Ohio road's expenses, as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Receipts	$2,180,981	$2,190,143	— $9,161	0.4
Expenses	1,477,903	1,385,205	+ 92,689	6.7
Net	$703,078	$804,933	— $101,840	12.6

Thus the aggregate gross receipts must have been nearly the same both years, which is better than most of the trunk lines have done, and the considerable decrease of 12½ per cent. in the net result is due almost wholly to an increase in working expenses, which, however, were not very large. In November, 1882, the leased road's expenses were reported as but 59½ per cent. of its earnings, but under the lease some things are charged to the expenses which were not previously, and very likely enough to make the difference.

Calculated on the same basis, the gross earnings of the Erie last November plus 68 per cent. of those of the Ohio road, though a trifle less than the year before, were considerably larger than in any previous year, but the net result to the Erie would have been exceeded in five out of the last seven years. In 1880 this net result would have been $891,320; in 1881, $763,341; in 1882, as we have seen, $804,938. But it was only $598,406 in 1878 and $650,104 in 1879, against $703,078 last November.

For the seven months of the lease the receipts (including only the Erie's share of the Ohio road's gross earnings), working expenses and net result to the Erie have been:

	Receipts.	Expenses.	Net.
May	$2,055,988	$1,424,933	$631,055
June	2,057,547	1,441,825	615,722
July	2,111 456	1,494.683	616,773
August	2,580.956	1,480.891	1,100,065
September	2.613,135	1,575,723	1,037,413
October	2,411,146	1,567,778	843,368
November	2,180,981	1,477,903	703,078

The gross earnings of the Erie alone have sometimes, but not always, decreased considerably from October to November. In 1882 and 1877 they were about the same in both months; in other years since 1877 they have been from $92,000 to $198,000 less in November. The gross earnings of the Ohio road have been from $10,000 to $69,000 less in November than in October. The aggregate gross earnings of the two in each month for six years, were:

Year.	Oct.	Nov.	Year.	Oct.	Nov.
1877	$1,959.420	$1.948,572	1880	$2,408,785	$2.250.029
1878	1.866,301	1,723.824	1881	2,289,909	2,168,597
1879	2,191,473	1,924,313	1882	2,375,585	2,364,883

The decrease in the total gross earnings from October to November has varied from $19,000 to $267,000, the larger decrease having been in 1879. In 1883 the decrease from October to November, only the Erie's share of the Ohio road's earnings having been included, was $230,000. Of course it is possible that the whole of the decrease was on the Erie, in which case the $230,000 is the decrease in the total gross earnings; but it is probable that it was partly on the Ohio road, and in any case the decrease was exceptionally large—which was true on most roads similarly situated last fall.

The Chesapeake & Ohio Railway has reported its earnings and expenses for 1883, showing an increase of $571,815 (17 per cent.) in gross earnings, an increase of $251,044 (11 per cent.) in working expenses, and therefore an increase of $320,771 (31 per cent.) in net earnings. This is a very large increase in net earnings to be made in such a year as 1883, but this is the first year that the company has had the benefit of a through connection to Cincinnati, Louisville and Memphis throughout the year. The earnings and expenses for eight successive years have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1876	424	$1 599,512	$1,243.036	$356,476
1877	424	1,702.533	1.363,225	339,308
1878	424	1,936,360	1,594,739	341,621
1879	424	1,891,542	1,507.333	384,209
1880	424	2,514.246	1,945,018	569,228
1881	424	3,375,968	2,7?1,430	632,538
1882	474	3,934.977	2,302,449	1,632,528
1883	519	3,906,791	2,553,492	1,353,299

The gross receipts have more than doubled, and the net earnings increased 250 per cent. since 1879; but the great increase is from a very low level. The gross earnings were but about $4,000, and the net earnings $800 per mile in 1877; in 1879 they had risen only to $4,460 and $906 respectively; in 1881 (before the road was extended to Newport News), they were $7,962 and $1,492, and last year amounted to $7,528 gross and $2,607 net per mile.

The road is now in position to compete for through cotton shipments from Memphis to the seaboard, though all but a comparatively small part of the line to Memphis is just north of the cotton country, and can collect but few local shipments; it is also in position to compete for the through business between the seaboard and the Ohio River towns and St. Louis, and does so to a considerable extent for New York business. The shipments of these places to Richmond or Norfolk have been but trifling (except tobacco from Kentucky), and if there are to be any exports of grain and provisions from Newport News, or other harbor at the mouth of the Chesapeake, this company must largely create it, and it will not be an easy task. Grain enough to fill up cargoes of cotton may easily be induced to take this route, perhaps; but after long years of extended railroad connections and an established commerce, Baltimore and Philadelphia have found it impossible to make any considerable exports of flour and provisions.

Much has been hoped for this road by the development of the great coal and iron mines on its route; but they have not developed rapidly, and the production of iron is not yet very important. It is to be said, however, that it increased more last year than ever before, when production in most states was decreasing. There is good reason for expecting that there will some time be an enormous production on the line of this road, but so there was when the road was completed to the Ohio, nearly 11 years ago: the uncertain thing is the *time* that will elapse before the coal and iron industry affords very large traffic to the road. Still, a good beginning has been made at last, and if the increase in earnings continues at something like the rate of the last few years, it cannot be very long before the road will meet the expectations raised when it was built, before 1873.

When the company was reorganized in 1878 the interest on the larger part of the funded debt was made payable partly in preferred stock, the amount in cash increasing gradually. In this way the cash interest charge, which was but $233,508 in 1881, rose to $684,569 in 1882 and $970,110 in 1883; and for the current year will be $1,371,910. In the last half of this year 1 per cent. in cash will be due on the $10,100,000 of second-mortgage bonds, and throughout the year the full 6 per cent. on the $15,000,000 of Series B first-mortgage bonds. The net earnings last year lacked but $18,600 of equaling this year's interest charges, and as the increase in net earnings was 63 per cent. from 1881 to 1882 and 31 per cent. from 1882 to 1883, there must be a tremendous change in the course of business on the road if the interest is not fully covered by the net earnings. That there are not now any signs of a such a change is indicated by the fact that in December, when most Southern railroads had a decrease in earnings, this one had an increase of 21 per cent. in gross and 41 per cent. in net earnings.

The Elizabethtown, Lexington & Big Sandy Railroad, which is the western connection of the Chesapeake & Ohio and is worked by the latter (which pays the total net earnings as rental), is a short road of only 135¼ miles, much of which is through a very thinly peopled and unproductive country, as may be known by the fact that though over this road comes all the Chesapeake & Ohio through traffic (being its sole rail connection with the West), last year, when its earnings were largest, they were only $5,263 per mile. In 1882 they were only $3,907, however; so there was an increase of no less than 34¾ per cent. last year. In net earnings there was an increase of 43 per cent., and this amounted to $1,600 per mile, which is not so bad for a road in the hills and woods of Eastern Kentucky, though one end of it is in one of the best

farming districts of America. The net earnings last year were $216,508, and the interest on bonds amounts to $210,000. The completion of the line in the interest of the Chesapeake & Ohio between Memphis and New Orleans, through the Yazoo delta, is likely to increase largely the amount of cotton passing over this road and probably also its other through freight, as it will then be a link in a line between New Orleans and the Northeastern seaboard. Whatever may be done to bring through traffic to the Chesapeake & Ohio will benefit this road, as it is the latter's sole connection with the Western and Southern railroad system.

The Oregon Railway & Navigation Company reports for December an increase of $146,850 (52 per cent.) in gross and of $88,231 (130 per cent.) in net earnings, while for the year ending with December there is an increase of $522,406 (10¼ per cent.) in gross and $190,620 (8.6 per cent.) in net earnings. The character of the company's business has been changed so essentially by the completion of the Northern Pacific Railroad and its own railroad down the Columbia to Portland, as well as by the multiplication of its local lines in Eastern Oregon and Washington, that comparisons have not great value, and it is important to know what the present result is. The gain seems very great in December, but that is because the earnings, gross and net, were very small in that month in 1882. The average monthly earnings in that year were $420,410 gross and $204,038 net, while in December the gross earnings were but $280,€5) and the net $67,769—the latter only one-third of the average. The company was working 531 miles of railroad at the beginning of 1883, and steamer lines between San Francisco and Portland, on Puget Sound, and on the Willamette, Columbia and Snake rivers—1,575 miles of routes. The completion of the railroad above Portland has rendered unnecessary a steamer line there, and the opening of the Northern Pacific substantially puts an end to the carriage of transcontinental traffic between Portland and San Francisco. But during 1883 something like 100 miles were added to its railroad mileage. Of this latter it leases 193 miles. The additions to its property have been nearly all made by issues of stock at par, of which there is no less than $24,000,000 outstanding; but its funded debt is exceptionally light, amounting to but $7,088,000 (counting with it $1,200,000 of 8 per cent. scrip certificates). This makes the debt less than about $17,700 per mile of road owned, and the yearly interest charge is but $448,800. The rental paid in its last fiscal year was $145,429 (for a road whose expenses were 150 per cent. of its earnings), and altogether, so far as ascertainable, the prior charges in 1883 absorbed but $600,000 of the $2,639,535 of net earnings. Some additional expenditures of capital will have to be made soon, however, for the completion of the branch which is to meet the Oregon Short Line of the Union Pacific (which is important), the improvement of the River Division, and the purchase of the Palouse Branch of the Northern Pacific (built by the Oregon & Transcontinental Co.), which latter will add 100 miles to the mileage, on which $25,000 per mile of bonds have been issued by the Transcontinental Company. It was intended to raise this capital by a new issue of bonds, but it is said that some legal obstacles intervene. As it is, and even if the funded debt were largely increased, the margin of net earnings over fixed charges is exceptionally large, so that the bonds seem unusually well protected. The company has been paying 8 per cent. on its $24,000,000 of stock, and its chief lines are in a country which was almost unoccupied only a few years ago, is found to be a most excellent wheat country, and has been settling very rapidly, but doubtless has but a small fraction of its good land utilized as yet, so that a great increase in their traffic is to be expected. On the lines which the company owns the gross earnings were at the rate of $7,000 per mile, and the net earnings $4,600 per mile in the last fiscal year (ending with June), and these are astonishingly large net earnings for a new railroad in a new country.

The final withdrawal of Col. E. W. Cole from railroad management by his retirement from his office as Vice-President of the Western & Atlantic Co. has passed almost without remark, which shows that with railroad men, as with others, fame is only transitory. A few years ago Colonel Cole was one of the best known and most frequently mentioned railroad men in the United States, or at least in the South. He was for a number of years Manager of the Nashville, Chattanooga & St. Louis Railroad, first as General Superintendent and afterward as President, and it was under his control that that company entered into a contest with the Louisville & Nashville for the control of the traffic of Georgia and the Southeast. For a time it seemed as though the Nashville & Chattanooga would succeed. It acquired importanc advantages, including a close alliance with the Central of Georgia and a contract for a lease of that road which was at one time ready for execution. But the Louisville & Nashville proved to have the most money, which is, after all, the chief point in a fight of this kind, and when Colonel Cole was apparently at the point of success the ground was cut from under him by his own stockholders, who sold a controlling interest in the company to its great rival. Since that time he has taken no prominent part, although he served for a time as Vice-President of the East Tennessee, Virginia & Georgia, and still retained his office on the Western & Atlantic. He has now retired from all connection with railroad work, and will, it is said, give his whole time to the development of some property which he owns in East Tennessee.

It may be noted that Mr. Newcomb, who managed the Louisville & Nashville at the time of the contest between the two companies, has also retired from railroad management, and is now a banker in New York.

The death of Mr. A. S. Matthews at Stonington, Conn., last Friday, removes one of the best known railroad men in New England, and a gentleman who was fairly entitled to be considered one of the fathers of the railroad profession in this country. Mr. Matthews was over 70 years old, and his whole active life had been spent in the construction or management of railroads. While still a boy he entered the service of the Baltimore & Ohio Company, whose engineers were then laying out the first beginning of the line from Baltimore west. After qualifying himself there for a better position he was employed as an assistant engineer on the old Paterson & Hudson River road, the New York & Harlem, the Boston & Albany, and the Boston & Providence, and finally entered the service of the Providence & Stonington road as Engineer, and continued with that company and its successor, the New York, Providence & Boston, until the time of his death, serving from 1836 to 1848 as Engineer, from 1848 to 1878 as Superintendent, and from the last named year, when his increasing age led him to give up part of his work, as Chief Engineer. Mr. Matthews' life was remarkable not only for his long experience as a railroad man but also for his long and faithful service with a single company. We doubt if any other man in this country could show a period of 48 years' continuous service on one road.

The transfer of the Delaware & Hudson Canal into a railroad seems to be contemplated. Mr. Thomas Dickson, the President of the company, recently gave evidence in a suit to reduce the assessment for taxes of part of the canal in which he said that the structure is no longer valuable as a canal, because transportation by it is not as economical as transportation by rail. Its only value now, he says, is as a roadbed for a railroad.

Yet this canal, it might seem, is exceptionally well situated for economical service. It can pass only small boats, it is true, but its traffic is nearly all anthracite coal, which affords a regular business and is cheaply handled, and as the outlet of the canal is on the Hudson, the boats can be towed to all places on that river, and on the Erie and Champlain canals; and from the iron mines of Lake Champlain can carry ore back nearly to the anthracite coal mines; nearly, but not quite, for the upper end of the canal at Honesdale (108 miles from the Hudson River end at Rondout) is not at the mines, but connected with them by the gravity railroad to Olyphant, about 30 miles. This, probably, is what makes the canal unprofitable. The coal has to be loaded in cars first of all, and once loaded it is well to avoid all transfers, which mean delay as well as cost. Further, it is a very great advantage to many consumers of and dealers in coal to have their supplies delivered at their factories and in their yards, which can be done by cars on a railroad, but in comparatively few cases by boats on a canal. Actually the Delaware & Hudson Canal boats for the most part discharge their cargoes at Rondout, and the iron ore from Lake Champlain is carried chiefly by the same company's railroad, and not by canal-boats, and the advantage of the Hudson River connection, except for the supply of New York city and other places in this harbor, has become comparatively unimportant. If the coal must be transferred at both ends of the canal, this is likely to neutralize any economy there may be in the bare cost of hauling it over a route only 108 miles long. If the country on the line had been populous probably a railroad would have been substituted for a canal long ago; but there is no large town on the line from one end to the other except Port Jervis, which is served otherwise.

Pig-Iron Production.

The pig-iron production of this country is concentrated in a comparatively small part of it to an extent greater than some people suppose, probably. Pennsylvania and Ohio last year made 64 per cent. of the total production of the United States, and the four contiguous states New York, New Jersey, Pennsylvania and Ohio have turned out in successive years:

	1879.	1880.	1881.	1882.	1883.
Tons	2,391,478	3,322,738	3,432,523	3,741,117	3,789,271
P. c. of total.	78.0	79.7	74.0	72 3	73.6

In all these states there has been a great increase since 1879, but last year all but Pennsylvania produced less than in 1880, 1881 or 1882, while the production of Pennsylvania was 7.7 per cent. more than in 1882, when it was much greater than ever before, and it produced 51.2 per cent. of the total United States production, against 47.3 per cent. in 1882, and less than 50 per cent. in every other year since 1879.

There has been a considerable increase in the Southern production, but it is not yet a large part of the whole, and it is not all in one district; Virginia and West Virginia may be said to form one district and Alabama and Tennessee another. The production in each of these four states and in the whole South south of the Potomac and the Ohio has been:

	1879.	1880.	1881.	1882.	1883.
Va	18,873	29,934	83,711	87,731	152,907
W. Va	70.801	70,3.8	66,403	73,220	88,398
Ala	49,841	77,190	98.081	112,765	172,465
Tenn	41,475	70,873	87,406	137,602	133,963
The four	180,990	248,315	335,607	411,318	547,733
Elsewhere South	69,448	87.525	87,177	111,433	102,374
The South	250,438	335.864	422,784	522,751	650,107
P. c. of total	8 1	7.8	9.1	11.0	12.6

None of these states had what can be called a large production in any of these years—none three times as much as the production of a single furnace in Pittsburgh; but the fact that there was a large increase in Virginia and Alabama last year, when in all Northern states except Pennsylvania there was a decrease, is an indication that it has been found less costly to produce pig iron there than in most other states. Against the increase from 1882 to 1883 of 124,876 tons in Virginia and Alabama we may set the increase of 189,635 tons in Pennsylvania; but the latter increase is but 7.7 per cent. while the former is 62 per cent. It will not do to put too much significance in this, however. The erection of a furnace is likely to be undertaken a considerable time before it is blown in, and though the making of pig iron almost everywhere was extraordinarily profitable for the three years before 1882, and profitable also in 1882, it seems to have induced the establishment of but very few furnaces either in Virginia or Alabama. The number of furnaces in and out of blast in each of these states on the 1st of January of five successive years has been:

Virginia:	1881.	1882.	1883.	1884.
In blast	13	15	15	12
Out of blast	24	25	23	30
Total	37	40	38	42
Alabama:				
In blast	13	13	12	14
Out of blast	2	2	3	5
Total	15	15	15	19

Thus the great increase in production last year of 75 per cent. in Virginia and 53 per cent. in Alabama seems to have been due to the addition of but four furnaces in each state, and in all the previous years of profitable production very few furnaces were erected there, though the production of Pennsylvania was increased 55 per cent. from 1878 to 1880, and 64 per cent. from 1879 to 1883—the latter increase amounting to 1,051,000 tons, which is more than three times the total production of Virginia and Alabama last year, and the production in the states west of Ohio increased 84 per cent. from 1879 to 1881.

It is natural to suppose that when prices are very low and most furnaces are idle production is reduced least in that district where the cost of production is least; and the maintenance or increase of production anywhere will be very good evidence of a low cost there when the period of low prices has lasted for a considerable time, and only the more favorably situated furnaces can produce without loss. Production will continue so long as *any* interest on the cost of the property can be earned, but it will not long be continued anywhere at a loss. Judging by the decrease in production last year iron-making had then become unprofitable for some furnaces in several states, for those named below showed the following decreases in production:

New York	20.0	Wisconsin	39.3
New Jersey	21 6	Michigan	17.6
Ohio	2.8	Missouri	9.0
Illinois	34.1		

Ohio's decrease is but trifling, but it follows a decrease in 1882, and of its 90 furnaces only 39 were in blast at the beginning of this year (43⅓ per cent., against 52.4 per cent. of the Pennsylvania furnaces). But we will do well to examine the course of production of the states west of Ohio by themselves, the fluctuations there having been great, and the total production comparable with that of the South. For six years the production of the four states west of Ohio which produce a considerable amount has been:

	Illinois.	Wisconsin.	Michigan	Missouri.	Total West.
1878	78,455	49,887	70,853	47,490	246,694
1879	78,143	89 522	101,539	84,637	353,841
1880	150,556	98 842	154,424	105,555	507,377
1881	251,781	102,029	187,043	109,799	650,652
1882	360,407	85,859	210,195	113,644	770,105
1883	237,657	51,893	173,185	103,296	566,031

Thus we see that these four states increased their produc

tion greatly as soon as it became profitable—44 per cent. from 1878 to 1879, 43½ from 1879 to 1880, 30 from 1880 to 1881, and 18½ per cent. from 1881 to 1882. But they have also been quick to reduce production when prices fell, and in 1883 their output was 204,000 tons (26½ per cent.) less than in 1882—more than any year's gain has been—and even 13 per cent. less than in 1881. In Illinois the decrease from 1882 was 34 per cent. Both fuel and ore are imported for Illinois furnaces, coke from Pittsburgh, and ore from Lake Superior or Missouri, but the ore is very cheaply obtained, and though the Illinois coal is not used (to any extent, at least,) for coke or raw in the furnaces, it heats the ovens for the hot blast. But if we must judge by the course of production Illinois and Wisconsin can afford to make pig iron only when it brings a high price. Nearly a fourth of the Bessemer steel capacity of the United States is in Illinois, which is three times as much as there is in any other state except Pennsylvania; and the pig-iron production has been largely by the companies owning these steel works, or by affiliated companies.

If we compare the production of these Western states with that of the four Southern states above we shall se that the totals in successive years were:

	1879.	1880.	1881.	1882.	1883.
Southern....	180,990	248,335	335,607	411,318	547,733
Western....	353,841	507,377	650,652	770,105	566,031

The Southern states, it may be added, produced 127,424 tons in 1878, against 246,694 in the Western states, and we may say that for four years previous to 1882 the Western production every year was just about double the Southern production; but in 1882 the Southern states increased 22.6 per cent. and the Western but 18.4 per cent., and in 1883 by an increase of 33 per cent. in the South and a decrease of 26½ per cent. in the West each of the groups is made to produce about the same amount—only 18,298 tons, or 3½ per cent. more in the West, which heretofore has usuually produced about 100 per cent. more than the South. As between these two districts, therefore, the South gives evidence in the last two years of the more persistent growth, the more so as the West has many of the secondary manufactures which consume great quantities of pig iron, while the South has few, and must therefore depend more upon a foreign demand—that is, a demand outside of the Southern iron-producing states.

The Alabama, New Orleans, Texas & Pacific Junction Company.

The Alabama, New Orleans, Texas & Pacific Junction Railways Company, Limited, is the long title of an English corporation which seems in nature much like the Oregon & Transcontinental, not owning any railroad, but owning enough of the stock of a number to exercise control over a considerable system, which may be briefly described as a line from Cincinnati to New Orleans, with a branch from Meridian *via* Vicksburg to a connection with the Texas & Pacific at Shreveport, the latter not yet completed. An important exception to the completeness of the system is the Alabama Great Southern, whose 295 miles between Chattanooga and Meridian intervenes between the northern member (the Cincinnati Southern) and the lines to New Orleans and Texas. The Alabama road is now worked by the same management as the other roads, but apparently the connection between it and them is not necessarily permanent. Of this system the Cincinnati Southern has large earnings, all the other ones very light ones—lighter even than most other Southern roads. The Alabama Great Southern passes through a coal and iron country where pig iron, it is said, can be made more cheaply than almost anywhere else in this country, but it is more than ten years since the development of these coal and iron properties began, and though for at least four years after 1878 iron making was generally extremely profitable, the earnings of this road have always been very light, averaging but $299 per mile per month in the first 11 months of 1883, when they were 25 per cent. more than the year before, and still larger than in any previous year. In 1882 its *net* earnings were $843 per mile, amounting to $249,376; but its fixed charges are but $105,000 ($3,620 per mile), and these very small net earnings were enough to permit a dividend of 6 per cent. on the preferred stock, which is equal in amount to the bonds. Thus, notwithstanding the very small earnings, there is a fair prospect for the common stock, which, however, is $7,830,000—2¼ times the sum of the bonds and preferred stock. It will require $724 per mile of net earnings to pay interest on the preferences, and 1 per cent may be paid on the common stock for every $270 per in addition. If the expenses in 1883 were the same proportion of the earnings as in 1882 the net earnings were $1,053 per mile, which would leave $4.20 per share after paying preferences.

The Vicksburg & Meridian is a much older property (dating from before the war), but not much more productive, its largest gross earnings having been at the rate of $323 and its largest net earnings $103½ per mile per month (in 1881), while in 1882 the net earnings (for the year) were but $995 per mile, and the gross earnings for the first 11 months of 1883 were $297 per mile per month—nearly the same as those of the Alabama Great Southern. This company has a considerable debt, but about half of it is in income bonds, and half of the rest bore but 3 per cent. interest until this year, and the fixed charges of $93,000 have been easily borne. These will be $104,000 in 1884 and 1885, $115,000 in 1886, and $126,000 thereafter. The net earnings in the two years since the reorganization in 1881 have been $178,153 and $141,324. It will require but $19,200 more than the obligatory fixed charges to pay 1 per cent. on the incomes, but they will take $134,400 before the preferred stock can have anything, and that will require an equal amount before the common stock gets anything. Net earnings at the rate of $1,834 will pay interest on all the bonds, including incomes, when the maximum interest is paid on the seconds, which will require an increase of nearly 50 per cent. over the best year heretofore; but these are not large net earnings, and if a considerable traffic is developed on the incomplete line across Louisiana the Vicksburg & Meridian should profit by it greatly.

This latter road, the Vicksburg, Shreveport & Texas, was completed from a point opposite Vicksburg west 74 miles just before the war, but was abandoned during the war and was worked only intermittently, we believe, afterwards until it passed into the hands of the present owners in 1881. Its gross earnings were but $1,396 per mile in 1882, and its net earnings were probably *nil*. It passes through a country much of which is subject to floods, and has outlets by rivers and bayous part of the year. Completed, it will connect with the whole Texas system of railroads, but they will not be likely to give it any more traffic than they can help, as they have their own outlets to St. Louis, to Memphis and to New Orleans. This will form the shortest route, however, from the South Atlantic ports to Northern Texas, and ought to be able to command considerable passenger traffic, if not freight. Almost anywhere else a railroad across a state so very far from other railroads as this will be would be sure of an abundant support; but experience has shown that railroads do not always thrive in the South even when they have the monopoly of a vast territory—witness the Alabama Great Southern and the Vicksburg & Meridian, just mentioned, which have been long in attaining even their present light earnings, and also witness the Mobile & Ohio, the Brunswick & Albany, the Macon & Brunswick, and other railroads. A very light capital alone makes it possible for them to line, and in many cases this condition has been reached through foreclosure and the sacrifice of a large part of the investment of the original stock or bondholders.

The New Orleaus & Northeastern is the last of the acquisitions of this company. It had this road built, and it has but just been finished; completing almost an air line from Chattanooga to New Orleans across a country thinly peopled and for the most part unproductive—a great forest of the long-leaved pine almost from one end to the other of its 194 miles. From near Enterprise, where it diverges from the route of the Mobile & Ohio, to the very outskirts of New Orleans, about 180 miles, it crosses no other railroad, and is not near enough to any to have the local traffic diverted from it; yet the aggregate population of the seven counties on this 180 miles was but about 29,000 by the last census. The railroad, however, may make it possible to manufacture lumber there to a greater extent than heretofore; and this affords a bulky traffic. This company has a funded debt of $5,000,000 of 6 per cent. bonds, which will require net earnings at the rate of $1,546 per mile to pay the interest.

These bonds, however, are nearly all owned by the London corporation which controls the system, which in the London papers of Jan. 19, advertised the balance of £800,000 of a total issue of £1,500,000 of its first 6 per cent. debentures, which presumably are to give it the means to complete payment for the New Orleans & Northeastern and to complete the Vicksburg, Shreveport & Pacific. With the railroad companies' bonds in its possession, as well as their stock, it will run no danger of losing control if the profits of the new roads should be less than was estimated.

By this organization it is possible for the English proprietors to be virtually the directors of the American railroads in which they have invested their money. That is, they are the directors of this investment company, and as holders of a majority interest can select the directors and dictate the management, though of course at such a distance they cannot do much more, and must leave the conduct of the several companies to their special agent, Mr. John Scott, who came to this country to reorganize the bankrupt Alabama & Chattanooga, and has planned the system which he now manages.

Last week we had reports of their January earnings from 20 railroads; this week from 28 more. Of those that report this week 17 have an increase in total earnings, but in their aggregate earnings there was a decrease of 1 per cent., notwithstanding an increase of 9½ per cent. in mileage.

For the 48 roads that have reported so far for the whole of the month of January the figures are:

	1884.	1883.	Inc. or Dec.	P. c.
Miles.....	40,336	36,846	3,490	9.5
Earnings.....	$14,743,596	$14,759,384	— $15,788	1.1
Earnings per mile..	366	401	35	9.0

The Grand Trunk shows a decrease of $254,086 (19.2 per cent.) in January, against a decrease of $144,418 (9.8 per cent.) in December and an increase of 6½ per cent. for the eleven months ending with November. This, with the decrease of 11½ per cent. on the Chicago & Grand Trunk, is the best indication we have of the course of through traffic, and is, of course, a very imperfect one. Other roads which carry more or less of this traffic show decreases generally in January—the Indiana, Bloomington & Western, 20 per cent., the Alton & Terre Haute Main Line, 9.8 per cent., the Cincinnati, Washington & Baltimore, 11.3 per cent.; while the Lake Erie & Western, whose situation is something like that of the Indiana, Bloomington & Western, suffered the very large decrease of 33½ per cent., its earnings per mile being the extremely small amount of $227.

The notable increases are 28 per cent. by the Peoria, Decatur & Evansville, 15 by the Kansas City, Fort Scott & Gulf and 31 by the Wisconsin Central. Several of the roads make a better showing in January than in December—that is, they gained more or lost less than in December—among them the Burlington, Cedar Rapids & Northern, the Chicago & West Michigan, the Cincinnati, Washington & Baltimore, the Flint & Pere Marquette and the Peoria, Decatur & Evansville; but some of the changes in the other direction are great, and they are especially so on the Northern Pacific, the Indiana, Bloomington & Western and the Grand Trunk.

The Milwaukee & St. Paul and the Chicago and North western, whose earnings made a very poor showing in January, begins February very much better, the former gaining 42½ per cent. and the latter 40¾ per cent. over last year in the first week of February.

Chicago through rail shipments eastward for the week ending Feb. 2, for five successive years, have been, by the complete reports:

1880.	1881.	1882.	1883.	1884.
41,775	53,209	73,425	45,029	40,727

Thus the shipments of the week this year were smaller than in the corresponding week of any of the four years previous, though only 9½ per cent. less than last year, and 2½ per cent. less than in 1880.

Of the shipments this year and last the percentage by each route was:

	1884.	1883.		1884.	1883
C. & Grand Trunk..	29.3	10.1	Fort Wayne.	14.2	21.1
Mich. Cen	11.6	24.8	C., St. L. & Pitts. ...	5.6	7.7
Lake Shore	17.4	24.3	Balt. & Ohio...	4.1	12.0
Nickel Plate.....	9.0	....	Chic. & At.....	8.8	....

Thus this year the Chicago & Grand Trunk took the lion's share, and nearly three times its allotted proportion, while all the other roads except the Nickel Plate had less than their share, the three Vanderbilt roads together 38 per cent. and the two Pennsylvania roads 19.8 per cent. of the whole.

The shipments for seven successive weeks have been:

Week ending—						
Dec. 21.	Dec. 31.	Jan. 4.	Jan. 13.	Jan. 19.	Jan. 26.	Feb. 2.
44,480	37,442	24,795	48,394	65,559	41,095	41,727

There is little difference in the shipments of the last two weeks, but they are very small, and there is but one week in the seven whose shipments can be called large, which is the one when probably most of the freight was carried at the 20-cent. rate. For this whole period the shipments have been 277,260 tons, against 360,908 tons in two days less time last year, a decrease of 83,648 tons, or 23¼ per cent. Last year the shipments increased greatly after the first week of February and remained very large until April. There is as yet no sign of large shipments this year.

It having been charged that the Vanderbilt roads had since navigation closed secured an undue proportion of the business by cutting rates, it will be interesting to note what the several roads have actually carried. We give the amounts and percentages for the period from Dec. 15 to Feb. 2, inclusive, which is 50 days:

	Tons.	P. c.		Tons.	P. c.
C. & Grnd Trunk..	42,469	13.4	Ft. Wayne	51,912	15.9
Mich. Cen...	51,237	15.7	C., St. L. & Pitts..	43,108	13.2
Lake Shore	61,981	19.0	Balt. & Ohio.....	14,523	4.5
Nickel Plate... ...	26,107	8.0	Chic. & At.....	33,403	10.3
			Total	325,741	

This shows the Vanderbilt roads in the aggregate to have earned 42.7 per cent. of the whole, which is very nearly their exact share. The Chicago, St. Louis & Pittsburgh carried much more than its share and the Fort Wayne much less, but both together 29.1 per cent., which is a little more than their awarded share. The exceptionally large proportion carried by the Vanderbilt roads has come from places other than Chicago, it would seem.

For the week ending Feb. 9 the incomplete report to the Chicago Board of Trade shows through and local shipments eastward of flour, grain and provisions amounting to 45,547 tons, against 34,341 tons in the corresponding week of last year, and 44,477 in the previous week of this year. Of these shipments 9,684 tons were flour, 29,404 grain and 6,459 provisions. The provision shipments were nearly 40 per cent. less than last year, the grain 45 and the flour 95 per cent. greater. This report has not much significance so far as the distribution of the shipments among the different roads is concerned, but it is interesting to note that the Nickel Plate is credited with larger shipments than any other road (20.7 per cent. of the whole), which has never before happened, we believe, that the three Vanderbilt roads together carried 56 per cent. of the whole, and that the Chicago & Grand Trunk, which had recently not often carried more than 11 per cent. awarded it, carried 20.1 per cent. of the whole, while the Fort Wayne is credited with but 7.7 and the Chicago, St. Louis & Pittsburgh with but 4.4 per cent—not half what they are entitled to. The Chicago & Atlantic carried 7.9 per cent. The course of the shipments would indicate that the Pennsylvania roads must have maintained rates so stiffly as to lose most of their business, and that the cutting was deepest by the Vanderbilt roads (chiefly by the Nickel Plate) and the Grand Trunk, while the Chicago & Atlantic must have been moderately virtuous to be so far below the Nickel Plate, yet not strictly virtuous to get more than the Fort Wayne.

The Chicago lumber trade, after two months of stagnancy rather greater even than usual in the dull months of December and January, has suddenly taken a start, prompted chiefly, it would seem, by a break in lumber rates to Missouri River points to 10 cents per 100 lbs. The recent arrangement to adjust rates from all points, including West Wisconsin mills, to Missouri River points has not been suc-

cessful, and the rate now made may be compared with the rate of 35 cents from Chicago to New York, about half the distance.

The breaks in lumber rates have been so frequent that shippers watch for them systematically; shipments are restricted as much as possible while rates are maintained, and when the rates are broken the lumber is hurried forward as fast as possible. Some of the great dealers in Chicago have yards of their own in the interior, and they can take advantage of such a time to forward as much of the season's stock as possible, as no increase of capital is needed for them, and they simply transfer a part of their stock in trade from one place to another. The reduction in the rate amounts to about $1.50 per thousand feet, which makes a great difference in the price of lumber. The small dealers are not quite so well prepared to take advantage of a break in rates, as it is not always possible for them to lay in an unusual stock; but all dealers are in danger of making a mistake by shipping too much, miscalculating what others may send, and so overstocking the distant market, while the Western dealer who laid in his stock when rates were maintained is badly off. If the low rates last for two or three weeks they leave the demand very light, of course, for some time afterward.

The number of hogs packed in the Northwest for the first three months of the season, November, December and January, were 4,640,000 this year against 5,080,000 last year, a decrease of 440,000, or 9½ per cent. Of this total decrease, no less than 325,000 has been at Chicago, which packed 41.4 per cent. of the whole last year and 38.4 per cent this year. The only places that packed more this year are Louisville, Cleveland, Dubuque and Sioux City.

The movement of the cotton crop has at last become comparatively light. The crop of 1883 is estimated as 6,000,000 bales or less, while that of 1882 was very nearly 7,000,000; yet the number of bales marketed in the four months from Sept. 1 to Jan. 1, this year, was 4,358,300 in 1883, against 4,421,600 in 1882—a decrease of less than 1½ per cent. But in January the bales marketed fell from 803,000 last year to 454,000 this year, a decrease of no less than 349,000 bales, or 43½ per cent., and the decrease for the five months of the crop year amounts to 412,300 bales, which is two-fifths of the estimated shortage in the crop. Last year about 75 per cent. of the crop was marketed in these first five months of the crop year, and about 1,760,000 bales remained to be marketed Feb. 1; if the crop estimate of 6,000,000 bales for 1883 is correct, at that date 1,200,000 bales remained in planters' hands this year, or one-fifth of the crop. We may therefore expect a movement for the remainder of this year which will be on the average nearly a third less than last year's movement in the corresponding seven months.

The great decrease in January we should expect to see reflected in the earnings of Southern railroads, as it is to some extent. The movement last year in January was extraordinary, and so were the earnings of the Southern railroads.

Though the decline for the remainder of the year is likely to be a large percentage, it can hardly be called a very large amount. It must be remembered that by far the larger part ot the crop is always marketed before this time, and this year, apparently, a larger proportion than usual. If the above crop estimate is correct, there remained to be marketed Feb. 1, 560,000 bales less than last year, which will be covered by an average decrease of only 80,000 bales a month. It is the effect of a short crop on other traffic that is most to be apprehended.

The death is announced on Feb. 2 of Prof. Charles A. Smith, from 1869 till a little more than a year ago Professor of Civil Engineering in Washington University, St. Louis, but at the same time engaged in the practice of engineering to an extent rare among instructors.

Professor Smith was born in St. Louis April 8, 1846, but in his infancy his parents removed to Newburyport, Mass., which he seems to have considered his home thereafter, and whither he returned to die. He was educated at the Massachusetts Institute of Technology, Boston, where he graduated in 1838 in a class including the late Frank R. Firth (who rose to be Superintendent of the Atchison & Nebraska Railroad and was killed by an accident on it only four years after graduating), and Prof. Charles E. Greene, of the University of Michigan. After graduating he was for a time in the office of Mr. J. B. Francis, of Lowell, the eminent hydraulic engineer, and with Professor Henck, of Boston. He was engaged for a time in the surveys for the Union Pacific Railroad, and also made some surveys in North Carolina. But it was very soon after graduating that he began to give instruction in engineering in Washington University, and nearly all his practical experience in engineering was gained while he was Professor there, his duties having been purposely arranged so as to enable him to spend a large part of his time in engineering work, which, perhaps because of his position as a teacher, he pursued with a student's eagerness. At one time he made a special study of bridge work, and was intimately associated with the accomplished engineers who built the St. Louis Bridge; he also made plans for water works at Hannibal and St. Charles, Mo., and for pumping machinery at Richmond, Va. A little later he turned his attention to mechanical engineering; and thenceforward seems to have made that his chief study. With Mr. Jacob Johann, of the Wabash Railway, he made some experiments with locomotives, the results of which were published with the reports of the Master Mechanics' Association, and recently he has been writing "A Practical Treatise on Boilers and their Use," which is appearing in the *American Engineer*, and will be published in book form by Wiley.

Professor Smith was a man of great energy and enthusiasm in his profession, eager to experiment and investigate, and had already made such additions to engineering knowledge that much was to be expected from him in the future. Aside from his books, which have not yet appeared, he was the author of various reports and many short articles in technical journals, the first of which, probably, appeared in the *Railroad Gazette* more than 12 years ago. For 12 years he was Secretary of the Engineers' Club of St. Louis. He was an Associate Member of the Master Mechanics' Association, and made important contributions to its papers. He was a member of the American Society of Civil Engineers from April, 1880.

The Union Pacific Railway has withdrawn from the Transcontinental Association, which was organized to maintain rates to and from the Pacific coast. The Association did not pool the traffic, and under it the Southern Pacific, in connection with the steamers from New York to New Orleans, has succeeded in getting about two-thirds of the shipments from the East. The Texas & Pacific, whose shipments must go by the Southern Pacific, cannot have secured much of the business; the St. Louis & San Francisco, in connection with the Atchison, Topeka & Santa Fe and the Atlantic & Pacific, has been more active recently in competing for business, it is understood, and it is announced that through cars will be dispatched by that route, which is extended across California by the Southern Pacific. The same roads without the Atlantic & Pacific connect with the lines from Chicago to Kansas City and Atchison, and all these together and the route formed by the Burlington and the Rio Grande in addition are working to turn business from the old direct route by the Union Pacific and the Central Pacific, which until recently had all the Pacific traffic to itself. With so many lines working for the business it is likely to be very difficult to maintain rates, and impossible without some kind of organization. The fact that one company works both the lines at the California simplifies matters somewhat, however.

Notice has been given of withdrawal from two of the traffic associations that were formed a little more than a year ago after the close of the St. Paul railroad war. The Rock Island last week gave notice of withdrawal from the Northwestern Traffic Association, which cares for the business of St. Paul and Minneapolis, and the Northwestern did the same in the case of the Central Iowa Association, which deals with the business of Des Moines and several Iowa points. These associations do not pool the traffic or earnings, but endeavor to maintain rates, and have machinery for that purpose which in some cases have been quite effective. There has not been much complaint of irregularities in the St. Paul business, but there has been some.

The new Western Trunk Line Association seems not to get along very harmoniously. The Iowa lines protest against the Union Pacific's making a pool with the Burlington on west-bound Utah traffic, claiming it to be their privilege to make west-bound rates and arrangements, and objecting to any pooling with the Burlington which does not include all the competitive west-bound business.

The record of Isabella Furnace No. 1, of Pittsburgh, for about three years, while it has been under the management of Mr. Hugh Kennedy as General Superintendent, has been made public as the most remarkable performance on record. The number of days in blast and the production in each year are given as follows (tons, 2,268 lbs.):

	1881.	1882.	1883.	1884.	Total.
Days	324	365	365	19	1,073
Tons	37,437½	59,032	66,408½	3,927	166,805
Tons per day	115½	162	182	207	155

The product of this one furnace in 1883 was about twice as great as the total production of all New England with 16 furnaces, and more than that of Maryland with 22 furnaces, Georgia with 6, Kentucky with 18, or Wisconsin with 15. The average production of all furnaces in blast in the United States last year was 14,377 tons, and of the bituminous furnaces in blast 23,600 tons, against 66,408 by Isabella No. 1. Eighty furnaces with such an average production would make more pig iron than has ever been produced in this country in a year, whereas there are 683 furnaces in the country and 221 bituminous furnaces.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads in 1884 as follows:

Atlantic & Danville.—Extended from Otter Dam, Va., westward to Waverley, 4 miles. Gauge, 3 ft.

Gainesville, Jefferson & Southern.—Extended from Hochston, Ga., south to the Apalachee River, 15 miles.

Louisville, New Orleans & Texas.—Extended this year from Magnolia, Miss., south 6 miles; from Cole's Creek, Miss., south 4 miles, and from a point eleven miles north of Baton Rouge, La., north 8 miles.

Union Pacific.—The *Oregon Short Line* is extended northward to Weiser, Idaho, 17 miles.

This is a total of 54 miles of new railroad, making 147 miles reported to date for 1884. The total track reported laid to the corresponding date for 12 years is as follows:

	Miles.		Miles.
1884	147	1878	136
1883	163	1877	62
1882	311	1876	70
1881	173	1875	62
1880	220	1874	66
1879	70	1873	226

The statements include *main track only*, no account being taken of second tracks or other additional tracks or sidings.

Railroad Policy in England.

II. RAILWAY COMBINATION—THE CLEARING-HOUSE.

In the year 1872 a member of Parliament said, "I do not think that there is at this moment a competitive rate existing in the Kingdom."

This of course could only be true in a limited sense. It did not refer to competition with water routes, but only to competition of railways with one another. Nor did it refer to the indirect competition, when each railway helps the producers in its own district to compete against other districts in a common market; which it tries to do by granting special rates. Of such special rates we are told that the Great Western alone has *twenty million* in force. But as regards direct competition between parallel lines of railway, the statement was not far from the truth; and it is probably still nearer the truth to-day.

How is it possible for such harmony to exist at all? By what means was it brought about?

The answer to the first question is to be found in the more stationary character of English business and population. A railway in England can calculate its probable business in advance. Proof of this may be found in the dividend returns of the year 1872—the latest figures to which the writer has access. From returns of the fourteen leading railway companies compiled by the Board of Trade in that year we find that of a common stock capital of £170,000,000, representing actual cost of construction, there was less than £10,000,000 that paid no dividend; about £12,000,000 more that paid less than 3 per cent.; while all the rest, or nearly seven-eighths of the whole amount, paid more than 3, and not more than 9 per cent. (These figures do not include the Irish railways.) And this, although the original investments of capital were made with a thoroughness and lavishness not tempered by any regard to the immediate wants of trade—the same lavishness which proved so unfortunate in the case of the Grand Trunk Railway, of Canada, and which English builders have until recently insisted upon manifesting all over the world.

So also if one railway builds a branch to compete with another for traffic of which the latter has hitherto had a monopoly, it can guess with some degree of accuracy what share of the traffic it is likely to control. The competition as long as it exists is less speculative. And, at any rate, one railroad war will generally settle the matter. With us a railroad war settles nothing. A truce is patched up for the time; but after a few years, or even months, pass, the conditions of traffic are so changed that the roads must fight it out over again. But in England the relative strength is settled once for all. A division of traffic which is right now is likely to be right ten years hence. There is no probability that new connections will be built or new districts developed in such a way as to seriously alter the relative strength of the competing parties. Still less likely is it that completely new through lines will be built to contend for their share in a new division. There has been no important case of the kind for more than thirty years. And so, while railway consolidation—or amalgamation, to use the English term—has often been slow, there have been hardly any backward steps. A working arrangement, once made, has continued to give satisfaction; a pool, once agreed upon, has been maintained for many years.

Under these influences the English system seems to have taken its permanent shape. At any rate, the twenty years of rapid development, from 1844 to 1864, have been followed by twenty years of comparative quiet. The arrangements made in the former period have proved serviceable throughout the latter.

These arrangements may be classed under three heads: (1.) Consolidation of a large number of independent lines into a few well-defined systems. (2.) Permanent agreements between these systems for division and interchange of traffic. (3.) A complete clearing-house organization to supervise the through business. Reforms, which in America belong largely to the future, have become established facts in England.

(1.) *Amalgamation.*—The original charters were for very short lines—much shorter than in this country. Fifty-seven separate railways chartered in 1844 averaged less than fifteen miles in length. The process of consolidation then began and made the most rapid progress. The lines of such consolidation were tolerably clear. The systems were not parallel, like our trunk line systems, but radiated from London as a common centre. Only in the manufacturing districts of the North could amalgamations be found independent of this plan of radiation from London. Had it not been for the broad gauge of the Great Western system at that time, which forced the narrow gauge lines of the West to seek their connections farther north, these different railway districts would probably have been separated by the very clearest lines through the whole centre and south of England. The rapid progress of railroad consolidation attracted much adverse comment. Efforts were made to stop it by action of Parliament. But the present advantages to the public as well as the shareholders so far outweighed the present evils that nothing was really done to prevent it. They only succeeded in maintaining the principle that no *general* powers of lease, purchase, or amalgamation should

be granted; that all such transactions should require special act of Parliament to sanction them. In the course of twenty years the railway map of England had taken its present appearance, nine systems leading out of London in different directions, and three groups in the north not reaching London.

(2.) *Working Arrangements.*—Of the various attempts to stop this tendency toward amalgamation the most vigorous was made in 1853, by what is known as Cardwell's Committee. They recognized the advantages which amalgamation offered, both to the railroads and to the public, in the matter of through traffic. They saw that if amalgamation was to be hindered some other means of securing these advantages must be found to take its place. They hoped to do this by an extensive system of "running powers."

When the first railways were chartered it was supposed that the companies would construct the double track to be used by individuals who should furnish their own cars and motive power. Experience at once showed that this was impossible. But it was not thus impossible that other railway companies might have the use of the road in this way. While independent roads were short and traffic was light this was done to a considerable extent—sometimes by private agreement, sometimes through act of Parliament compelling one road to allow such privileges to others. It was the intention of Cardwell's Committee to encourage such arrangements and privileges. But they were not successful. If it was for the interest of the connecting roads to enjoy them by mutual agreement it was generally still more for their interest to amalgamate. If they were enjoyed not by agreement but by compulsion, they did very little good. Compulsory running powers were a great burden upon the road against which they were put in force; and if the management of that road was disposed to be ugly about it they caused almost equal vexation to the road that tried to make use of them. This being the case compulsory running powers over a hostile road were often waived in return for a money payment. In fact, they became little better than a means of levying blackmail. Some such arrangements of course exist and to a somewhat greater extent than with us; but they come chiefly into play when two large companies, which cannot consolidate and do not want to fight, use a comparatively small portion of line in common.

The arrangements between competing lines are as varied as in America, and more efficient. They can be made to work more smoothly because the country is so divided into districts that competing lines do not build indiscriminately into one another's territory. The cases where a shipper has choice between more than two systems are comparatively rare. The roads take whatever steps are needed to secure harmony. If an agreement to maintain rates is enough, there it remains; if a pooling arrangement is needed, it comes to that. Money pools have prevailed rather than traffic pools. The most important of these dealt with traffic origiuating in the neighborhood of Manchester and Liverpool. The London & Northwestern Company seems to have taken the lead in this policy; the Midland, on the other hand, while ready to agree upon rates, has shown itself disinclined toward pools. Upon the legality of these money pools, or "joint-purse arrangements," as they are called, a good deal of doubt has been thrown from various quarters; but they have continued in force nevertheless, and nearly thirty years ago an important agreement of this kind was arranged by no less a statesman than Mr. Gladstone as arbitrator. These agreements are often made to run for much longer periods than would be deemed practicable here.

All these arrangements are made independently of any general organization. There is no Joint Executive Committee. The Clearing-House altogether avoids dealing with these things. Differences arising between two or three railways do not, as with us, affect a whole system of connecting lines. They can settle it for themselves, or even leave it unsettled for a while, without affecting the general railway business of the country.

(3) *The Clearing-House.*—It must constantly be borne in mind that the English Railway Clearing House is not a judicial body, nor even an executive body in the wider sense of the word. It decides no disputed questions; it makes no rates. It is simply a highly organized piece of machinery to facilitate traffic and traffic accounts. We are apt to forget its true character because it is so highly organized and because it is an incorporated body. But it is nevertheless a machine. Except in the matter of classification it has no more independent action than a co-operative fast freight line nominally has, and not so much as most fast freight lines occasionally have in times of railroad war.

There never have been any fast freight lines in England. This seems to have been due to two causes. Before the time of railway amalgamation the public had not given up the notion of private ownership of cars or restricted it to mineral traffic; and after the amalgamations the critical point of transshipment would very frequently be at London, where every business house would have an agent who could look after matters and call either or both the companies to account. At any rate, the demand for responsibility on through freight consignments did not come from the public. The Clearing-House was an association entered into by the railways for their own convenience without outside pressure.

It originated in 1842. A few not very important railways organized it as an experiment in keeping accounts. It proved so convenient that others soon wished to join. In 1850 it was incorporated; but it had so little public prominence, even at that time, that a member of the Parliamentary Committee of 1853, already alluded to, asked one of the witnesses what he meant when he spoke of the Railway Clearing-House. Its subsequent growth was steady and by no means slow, so that for the past fifteen or twenty years it has included practically all of the railways of England.

Each company is represented by one delegate in the Clearing-House Committee, which meets quarterly. A two-thirds majority is required for action. There are also quarterly meetings of general managers, of goods managers, and of superintendents of companies connected with the Clearing-House, and these separate bodies make rulings on points which concern their own particular departments of work. The leading permanent officers of the Clearing-House are a Secretary and a Treasurer. The Secretary acts as executive officer in behalf of the committee whenever such action is needed. There are also special committees for arbitration in case of loss, damage, or disputed items in the account.

Cars carrying any considerable amount of through freight may all pass from one railway to another without transshipment. No "paid-ons" are collected by one company from another. The way bill, an abstract of which is sent to the Clearing-House, furnishes a claim which is as good as the money. Only in case of undercharge the road collects the deficiency.

The gross sum received for a consignment of freight, whether paid by the sender or the consignee, is debited to the road that collects the money. The credits for this sum are distributed among the different companies as follows: First a fixed sum of 1s. 6d. per ton is set apart for station expenses at each end (except in the lowest class of traffic, which pays half this amount). Then in the case of all carted goods an arbitrary credit is made at each end for expenses of collection and delivery—7s. per ton in London, 2s. 6d. in other places. This is unfair in a great many instances, but it is claimed that the inequalities balance each other for the whole work of a railway company. The sum remaining after these deductions for terminals is prorated among the roads over which the goods have been carried, usually upon the basis of miles actually traversed. But a company cannot, in general, claim credit for more than its shortest possible route between the points where the goods entered and left its lines. And on the other hand constructive mileage agreements are not uncommon. In fact, any two or more roads may make any sort of agreements they please about through traffic, or may even for the time being "agree to disagree," and the Clearing-House will not interfere; it will hardly consent to arbitrate when requested to do so by both parties. Its arbitration committees are for quite another purpose—not to make rules, but to decide questions of liability under existing rules. The separate roads must make their own agreements. But all extra expenses to the Clearing-House involved in these agreements or disagreements are carefully charged to the companies in question.

For instance, in the matter of classification: there is a system generally adopted throughout England known as the Clearing-House classification. It has been formed by the Clearing-House, and is but slightly changed from year to year. Each railroad had originally quite a different classification of its own, but they have all found it convenient to adopt this general system. But there are certain districts where a different classification is found more available, and this difference may affect the billing of the through business. Unless the companies handling such consignments object, the Clearing-House does not; it only makes an extra charge for the greater trouble in making up the accounts. So of special rates: any two or more companies are at liberty to make what rates they please and divide them as they please, and the Clearing-House will carry out their wishes. But if one company makes a through rate and another company is dissatisfied with its portion of that through rate, and insists upon charging its own local rate—which it has a right to do when there is no agreement to the contrary—the Clearing-House takes no responsibility in the premises. It simply leaves that account open till the matter is settled.

To be able to do this the Clearing-House arranges its accounts by groups of companies. The simplest groups deal with traffic which passes over the lines of only two companies. In these the Clearing-House only makes up the accounts, leaving the companies to verify the details of weight and classification. But in groups of three or more companies the Clearing-House verifies the returns and makes up the accounts, not merely of the sums paid and due, but of the weight and character of the goods. It is here that the necessity of a uniform classification makes itself most strongly felt.

To control the companies in their use of one another's rolling stock the Clearing-House has employés of its own, "number-men," at the junctions of one system with another, to take the numbers of the through cars there transferred. The freight returns would also show the same facts, but in them there is more liability to error. By these means the Clearing-House knows where one road receives cars of an other, where it gives them up, and how long it keeps them; it credits and debits mileage on a system like that of a co-operative freight line, only more complicated, and often makes charges for delay in returning. Like a fast freight line it also takes cognizance of cases of loss and damage; it debits them to the proper road when that is possible, and prorates them as best it can in other cases. The clearing system includes passenger traffic as well as freight; but the questions involved are so much simpler that it is hardly necessary to consider the details.

The Clearing-House makes up its books monthly, and so well organized is the system that it is able to make its return to the railways ten days after the close of each month.

The expenses of the Clearing-House are not divided directly among the companies. They fall into two main divisions, one in connection with the use of one another's rolling-stock by the companies, the other in connection with their traffic accounts. The general expenses, which do not fall under either head, are prorated between the two. The rolling stock account expenses are divided upon a complicated basis of special services rendered. As for the traffic accounts, the cost of making them up among each group of companies is kept carefully apart, and is divided among the members of the group in proportion to their earnings from that particular traffic.

ARTHUR T. HADLEY.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Atlanta & Charlotte Air Line, annual meeting, at the office, No. 48 Wall street, New York, March 12, at noon.

Burlington, Cedar Rapids & Northern, annual meeting, at the office in Cedar Rapids, Ia., Feb. 26.

Cleveland, Columbus, Cincinnati & Indianapolis, annual meeting, at the office in Cleveland, O., March 5, at 10:30 a. m. Transfer books close Feb. 18.

Delaware, Lackawanna & Western, annual meeting, at the office in New York, Feb. 26, at 10 a. m. Transfer books close Feb. 6.

Missouri Pacific, annual meeting, at the office in St. Louis, March 11, at 9 a. m. Transfer books close Feb. 9.

Pittsburgh, Fort Wayne & Chicago, special meeting, at the office in Pittsburgh, April 3, at 11 a. m., "to consider and act upon a proposition to create a bonded indebtedness of the company."

Union Pacific, annual meeting, at the company's office in the Equitable Building in Boston, March 5, at 10 a. m. Transfer books close Feb. 19.

Wabash, St. Louis & Pacific, annual meeting, at the office in St. Louis, March 11. A special meeting will also be held at the same place March 22. Transfer books will be closed from Feb. 9 to March 24.

Dividends.

Dividends have been declared as follows:

Chicago & West Michigan, 2 per cent., payable Feb. 15, to stockholders of record Feb. 9. Last February this company paid 3 per cent.

North Pennsylvania (leased to Philadelphia & Reading) 2 per cent., quarterly, payable Feb. 25, to stockholders of record Feb. 13.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Institute of Mining Engineers, annual meeting, in Cincinnati, beginning Tuesday evening, Feb. 19. Mr. L. E. Warner, Cincinnati, O., is Chairman of the local Committee of Arrangements. A circular will be found below giving the details of the meeting.

Southern Railway & Steamship Association, called general meeting, at the Metropolitan Hotel in Washington, on Tuesday, Feb. 19, at noon.

General Baggage Agents' Association, annual convention, in St. Louis, on Wednesday, Feb. 20.

Master Car-Builders' Club, regular monthly meeting, at the rooms, No. 113 Liberty street, New York, Thursday evening, Feb. 21, at 8 o'clock. Subject for discussion: "The benefits to be derived by railroads and car manufacturing companies from the adoption of standard freight cars of the various classes."

Western Association of General Passenger and Ticket Agents.

The annual meeting of the Western Association of General Passenger and Ticket Agents, which was called for Feb. 13, at Cincinnati, has been postponed on account of the floods and the consequent interruptions to railroad travel. A date for the meeting will be announced hereafter.

Trunk Line Presidents' Meeting.

A meeting of presidents of the trunk lines and their western connections was held at the Commissioner's office in New York, Feb. 7, the object being to take measures for the better maintenance of freight rates. The Erie road was represented by Messrs. Jewett and Blanchard, the New York Central by Mr. Hayden, the Pennsylvania by Messrs. Roberts and Thomson, and the Baltimore & Ohio by Messrs. Robert Garrett and Harriott. There were also present Messrs. McCullough of the Pennsylvania Company, Newell of the Lake Shore, Ledyard of the Michigan Central, Devereux of the Cleveland, Columbus, Cincinnati & Indianapolis, Sergeant of the Grand Trunk and Corbin of the Indiana, Bloomington & Western. After a general discussion of the situation it was agreed to restore tariff rates both east and west-bound at once, and the Commissioner was requested to notify all the roads represented in the Joint Executive Committee to maintain tariffs strictly. The establishment of a clearing-house for the settlement of accounts of railroads in the division of through business both east and west bound was discussed, and the plan was referred to the Trunk Lines Standing Committee to perfect the details. It was also agreed that the Peoria pool should be re-established and that interior pools should be formed at other competing points.

Western Society of Engineers.

At the regular meeting in Chicago, Feb. 5, the following names were proposed for election as members:

George E. Palmer, Western Manager and Superintendent for the Babcock & Wilson Co.; George Remington Bramhall, Superintendent of Bridges, Department of Public Works, Chicago.

Mr. Ferdinand Hall, Assistant Engineer, Chicago & Alton, was elected an Associate.

Written arguments on the question of withdrawal from the Association of Engineering Societies were presented.

A verbal discussion on the question was participated in by Messrs Wright, Liljencrantz, FitzSimons and Cole, in the affirmative, and by Messrs. MacHarg and Williams in the negative.

At the conclusion of the discussion Mr. MacHarg presented the following, which was adopted:

"*Whereas*, There seems to be a misunderstanding as to the expense and time involved in the publication of the 'Journal of Associated Engineering Societies,' and

"*Whereas*, The discrepancies should be reconciled in order to a fair judgment, be it

"*Resolved*, That a committee of three be appointed by the Chair to report all facts in this connection at the next meeting."

The Chair appointed Messrs. MacHarg, Nichol and Wright as this committee.

Engineers' Club of Philadelphia.

At the regular meeting on Feb. 2, Mr. Wm. Lorenz presented a comprehensive discussion of steel and iron railroad ties, illustrated by numerous full-sized models and drawings.

Mr. C. J. Quetil, introduced by Mr. J. J. de Kinder, gave an illustrated description of his wire truss railway.

President Wm. Ludlow exhibited specimens of obstructed

water pipe, discovered in his practice, and explained the chemical causes which led thereto.

Mr. J. Milton Titlow exhibited and described a full set of general and detail drawings for the proposed stone bridge over the Schuylkill River at Market street, Philadelphia. As the cost thereof is estimated at $1,200,000, in the discussion which followed. President Ludlow suggested the alternative of building two $600,000 iron bridges therewith —one at Market street and one at Walnut street, over the Schuylkill, the latter bridge being very greatly needed at this time.

Mr. E. F. Loiseau presented a description of the process of manufacture of Portland cement by the application of his solidifying apparatus.

ELECTIONS AND APPOINTMENTS.

Addison & Northern Pennsylvania.—At the annual meeting in New York, Feb. 7, directors were elected as follows: Thomas C. Platt, William C. Sheldon, Henry P. De Graaf, James D. Fish, Roscoe Conkling, George R. Blanchard, Walter S. Gurnee, Bird W. Spencer, James E. Jones, Richard G. Taylor, Charles L. Pattison, James Horton, John W. Hammond.

Baltimore & Ohio.—Mr W.T. Manning has been appointed Master of Road of the Pittsburgh Division, with office at Connellsville, Pa., in place of E. Yardley, resigned.

Boston & Albany.—At the annual meeting in Boston, Feb. 13, the old board was re-elected, as follows: Jarvis N. Dunham, Henry Colt, Pittsfield, Mass.; Edward B. Gillett, Westfield, Mass; James A. Rumrill, Springfield, Mass.; George O. Crocker, New Bedford, Mass.; Jacob C. Rogers, Peabody, Mass.: Edward L Davis, Worcester, Mass.; John Cummings, Woburn, Mass.; Charles S. Sargent, Moses Kimball, Brookline, Mass.; Wm. Bliss, John C. Phillips, Mahlon D. Spaulding, Boston.

Chicago & Atlantic.—The following order from Hugh J. Jewett, President, is dated Feb. 1:

"1. Executive order No. 1, devolving upon the General Superintendent the duties of Vice-President is hereby rescinded.

"2. F. Broughton is hereby appointed Assistant to the President, with headquarters at Chicago, Ill. He will represent the President, and under his direction will have the charge and management of the road, property and business of the company, and will discharge such other duties as may be from time to time assigned to him. His orders will be obeyed by all officers, agents and employés."

Mr. Broughton was formerly General Manager of the Great Western Railway, of Canada.

Chicago, Burlington & Quincy.—Mr. H. D. Badgley has been appointed Traveling Agent of this company with headquarters at No. 153 Jefferson avenue, Detroit, Mich., and will travel in the territory north of the main line of the Michigan Central road, also in the Dominion of Canada west of the Northern Railroad of Canada, embracing all lines between Lake Erie and Lake Huron.

Florida Southern.—The following circular has been issued by Superintendent J. D. Hollister: "Beginning with Feb. 1, 1884, Mr. O. W. Bromwell will take charge of the freight and passenger business of the Florida Southern Railway, and all communications on business connected with that department must be addressed to him at Palatka, Florida."

Hannibal & St. Joseph.—Mr. T. L. Dunn, who was recently appointed as Acting General Superintendent in place of W. R. Woodard, resigned, has been appointed Superintendent.

Lackawanna & Pittsburgh.—At the annual meeting in New York, Feb. 12, the following directors were chosen: J. N. Borland, Jr., M. S. Blair, George D. Chapman, Frank Jenkins, C. E. Kimball, Archer N. Martin, A. W. Miner, Henry A. V. Post, Frank S. Smith, Clinton R. Weeden, Oliver Watson, A. J. Wellman, Cyrus H. Witherbee. The board elected Archer N. Martin, President; Frank S. Smith and Frank Jenkins, Vice-Presidents; C. E. Kimball, Secretary and Treasurer.

Lehigh Valley.—Mr. Elisha P. Wilbur has been chosen President in place of Harry E. Packer, deceased. Mr. Wilbur has been a director of the company for many years, and is now the surviving trustee of the Packer estate. He is a nephew of the late Judge Asa Packer, and he was for some years his financial agent and confidential a torney.

Little Rock, Mississippi River & Texas.—Mr. F. A. Lister has been appointed General Superintendent in place of Theodore Hartman, resigned. He holds the same office on the Little Rock & Fort Smith road.

Little Rock & Fort Smith.—Mr. F. A. Lister has been appointed General Superintendent in place of Theodore Hartman, resigned. Mr. Lister has been for some two years past Superintendent of the Northern Division of the Mexican National road, and was previously for a number of years Superintendent of the Camden & Atlantic road.

Louisville, New Albany & Chicago.—Mr. A. B. Southard, Traffic Manager, will for the present act as General Passenger Agent in place of Murray Keller, resigned.

Lowell & Framingham.—At the annual meeting in South Framingham, Mass, Feb 7, the following directors were chosen: S. N. Aldrich, H. A. Blood, Wm. O. Brown, John H. Buttrick, Charles F. Choate, James W. Clark, Frank A. Day, John Fletcher, D. E. Harding, Jacob Nichols, S. B. Rogers, Nathaniel Thayer. The road is leased to the Old Colony.

Massillon & Cleveland.—At the annual meeting in Massillon, O., last week, the following directors were chosen: Louis H. Meyer, Charles W. Case, New York; J. N. McCullough, Pittsburgh; Simon Perkins, Akron, O.; John Sherman, Mansfield, O.; P. G. Albright, Massillon, O.; J. F. Card, Cleveland, O. The road is leased to the Pennsylvania Company.

New London Northern.—At the annual meeting in New London, Conn., Feb. 6, the following directors were chosen: Robert Coit, Wm. W. Billings, Wm. H. Barnes, Benjamin Stark, Augustus Brandegee, J. N. Harris, C. A. Williams, Thomas Ramsdell, C. H. Osgood, William H. Hill, J. A. Rumrill. The directors re-elected these officers: President and Treasurer, Robert Coit; Secretary, J. A. Southard.

Northwestern Traffic Association.—Mr. George M. Bogue has been chosen Arbitrator for this association. Mr. Bogue is now the Arbitrator for the Northwestern Traffic Association, the Colorado Traffic Association, and the Southwestern Railway Association.

Pennsylvania Canal.—At the annual meeting in Philadelphia, Feb. 12, the following were elected: President, Isaac J. Wistar. Directors, George B. Roberts, A. J. Cassatt, Wistar Morris, William J. Howard, J. N. Du Barry, Edmund Smith, M. Hall Stanton, Alexander Biddle, Simon Gratz, John P. Green, Henry M. Phillips. Secretary, Alfred Mordecai. Treasurer, Thomas P Haviland.

Pennsylvania Railroad Coal Companies.—At the annual meetings held in Philadelphia, Feb. 12, officers were chosen as below by the coal mining and transportation companies named, which are controlled by the Pennsylvania Railroad Co.: *Summit Branch.*—President, George B. Roberts; Vice-President, Isaac J. Wistar; Directors, A. J. Cassatt, Edmund Smith, Wistar Morris, N. Parker Shortridge, J. N. Du Barry, John P. Green, James W. Johnson, William J. Howard; Secretary, Alfred Mordecai; Treasurer, Thomas P. Haviland. *Lykens Valley.*—The same officers and directors, with the exception of James W. Johnson. *Mineral Railroad & Mining Co.*—The same. *Susquehanna Coal Co.*—The same.

Pittsburgh & Neville Island.—The directors have elected John M. Phillips President; Charles P. Ford, Secretary and Treasurer; Henry Myer, Solicitor.

Pittsburgh & Western.—Mr. Thomas M. King, General Manager, gives notice that Mr. J. L. Kirk will be relieved of his duties as General Freight and Passenger Agent by Mr. F. A. Dean, who will have charge of freight rates, etc., while Mr. Kirk will continue as Auditor of the company.

St. Louis, Hannibal & Keokuk.—The United States Circuit Court has appointed Mr. Erwin I. Case, of Peoria, Ill., Receiver of this road in the foreclosure suit recently begun.

Schuylkill Navigaiton Co.—At the annual meeting in Philadelphia, Feb. 12, the following were elected: President, Frederick Fraley. Managers, John N. Hutchinson, Charles W. Wharton, George Brooke, Charles Baber, Michael Ward, Thomas R. Patton. Treasurer and Secretary, Richard Wilkins.

South Florida.—At the anual meeting Jan. 31 the following directors were chosen: James E. Ingraham, Sanford, Fla.; H. S. Haines, Savannah, Ga.; B. F. Newcomer, Baltimore; E. B. Haskell, R. M. Pulsifer, Boston; M. K. Jesup, H. B. Plant, New York. The board elected James E. Ingraham President; R. M. Pulsifer, Vice-President; C. C. Haskell, Treasurer; F. H. Rand, Secretary and General Freight and Ticket Agent; W. McCoy, Auditor; H. S. Haines, Chief Engineer; B. R. Swoop, Superintendent.

Wells-Fargo Express Co.—At the annual meeting in Denver, Col., Feb. 5, the following directors were chosen: Lloyd Tevis, Charles Crocker, John J. Valentine, Oliver Eldridge, Leland Stanford, San Francisco; James C. Fargo, New York; Charles Fargo, Chicago. The board elected the following officers: President, Lloyd Tevis; Vice President and General Manager, John J. Valentine; Secretary, James Herron; Treasurer, Henry Wadsworth, all of San Francisco.

Western & Atlantic.—At the annual meeting in Atlanta Ga., last week. Hon. Joseph E. Brown was re-elected President, and Mr. W. C. Morrill Secretary and Treasurer. Mr. Morrill was elected Vice-President in place of Col. E. W. Cole, who declined a re-election.

Western Railrond Association.—At the annual meeting in Chicago last week the following officers were elected: B. F. Ayer, President; General Counsel and Treasurer, George Payson; Secretary, C. R. Babeuf; Executive Committee, B. F. Ayer, T. F. Withrow, B. C. Cook, A. L. Osborne, and John Newell. The latter was chosen in place of Mr. T. B. Blackstone, who refused to serve another term because of ill-health and other duties.

PERSONAL.

—Mr. Sidney B. Jones has resigned his position as General Northwestern Traveling Agent of the Louisville, New Albany & Chicago road.

—Col. E. W. Cole has declined a re-election as Vice-President of the Western & Atlantic Co., thus withdrawing entirely from railroad business.

—Gen. E. F. Winslow has resigned his position as President of the North River Construction Co., and his resignation has been accepted by the board.

—Mr. Murray Keller, for some time past General Passenger Agent of the Louisville, New Albany & Chicago road, has resigned that position. Mr. Keller is a young man, but has made a good record for himself in the passenger business.

—Mr. Louis Blankenhorn, who recently resigned his position as Division Freight Agent on the Chicago, Milwaukee & St. Paul road on account of ill health, has bought a fruit farm near Los Angeles, Cal., and will settle there for the present.

—Mr. William L. Halsey died in Rochester, N. Y., Feb. 5. Mr. Halsey was for a long time engaged in California and Utah as agent for Wells, Fargo & Co., and afterward became a railroad contractor, having large contracts on the California & Oregon and several other roads in California and the territories.

—Prof. Charles A. Smith, late of Washington University, St. Louis, died at Newburyport, Mass., Feb. 2, at the age of 38. He was born in St. Louis, but was reared in Newburyport, and was graduated at the Massachusetts Institute of Technology. As a civil engineer he constructed the St. Louis Chamber of Commerce and other important buildings, and built the St. Charles Water-Works. He was a member of the American Society of Civil Engineers, and was for many years Secretary of the Engineers' Club of St. Louis. He was also a member of the American Association for the Advancement of Science, and associate member of the American Master Mechanics' Association. Prof. Smith has been a frequent contributor to our columns.

— Mr. A. S. Matthews died at his residence in Stonington Conn., Feb. 8, aged 70 years. He was born in Maryland in 1814, and when but 16 years old obtained employment with the engineer corps then employed in surveying the Baltimore & Ohio road. After several years' service there he came northward and was employed as Assistant Engineer on the New York & Harlem, the Paterson & Hudson River, the Boston & Providence and the Taunton Branch roads. In 1836 he entered the service of the Providence & Stonington (now the New York, Providence & Boston) road as Engineer, and 12 years later was made Superintendent of the road, holding that office for 30 years, until 1878, when he retired on account of increasing age and ill health. On his retirement he was made Chief Engineer of the road and held that office until his death, having thus passed 48 years in the service of the company. Mr. Matthews was widely known among New England railroad men, being looked upon as the father of their fraternity, and his death will be mourned by a wide circle of friends.

TRAFFIC AND EARNINGS.

Texas Meat Shipments.

The Texas Continental Meat Co. has established slaughter houses and storehouses in Fort Worth, Tex., and has made all arrangements for slaughtering cattle there and shipping the beef in refrigerator cars to northern and western cities. The company expects to do business on an extensive scale.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Month of January:				
Bur., Cedr R. p. & No.	$213,663	$197,402	I.	$16,261	8 2
Canadian Pac.	259,000	189,000	I.	70,000	37.0
Ches. & Ohio.	281,395	251,970	I.	29,425	11.7
Central Pacific.	1,583,000	1,718,000	D.	135,000	7.8
Chi. & W. Mich.	102,985	97,876	I.	5,109	5.2
Cin., New Or. & Texas Pac.	183,348	187,977	D.	4,629	2.4
Cin., W. & Balt.	133,860	150,853	D.	16,993	11 3
Cleve., Ak. & Col.	31,562	37,034	D.	5,472	14.8
E. Tenn., Va. & Ga.	309,879	302,979	I.	6,900	2.3
Eliz., L. & B. S.	45,825	47,893	D.	2,068	4.3
Ft. Worth & D.	24,500	25,000	D.	500	2.0
Flint & Pere M.	186,449	190,554	D.	4,105	2.1
Grand Trunk.	1,068, 587	1,322,673	D.	254,086	19.3
Green Bay, W. & St. P.	30,109	23,826	I.	6,283	26.2
Ill. Cent., Ill. & So. divs.	792,800	979,717	D.	186,865	19.1
Iowa Div.	127,100	121,942	I.	5,152	4 2
I., Bloom. & W.	198 685	248 143	D.	49,458	19.8
Kan. C., W. S. & G	181,352	157.750	I.	23,602	14.9
Kan. C., Sp. & Mem.	69,850	.....	..	.....	....
L. R. & Ft. S.	42,000	50,542	D.	8,542	17.0
Lake Erie & W.	87,638	131,696	D.	44,058	33.4
Mem. & Char.	79,617	72,254	I.	7.363	10.2
Norfolk & W.	192 225	168.499	I.	23.7.6	14.0
Northern Pac.	565,500	387,928	I.	177.572	45.3
Ohio Central	87.260	78,369	I.	8,891	11.4
Peoria, Dec. & E.	64,732	50,482	I.	14,250	28.2
Rich. & Dan.	266,880	259,757	I.	7,132	2.7
St. L., A. & T. H., Maine Line	119,238	132,093	D.	12,855	9 7
Shenandoah V.	51.211	41,360	I.	9,851	26.9
Western N. C.	28.455	20,457	I.	7 998	39 0
Wisconsin Cent.	122.033	93,231	I.	28,802	30.9
First week in February:				
Chi. & Alton.	$137.648	$133,505	I.	$4,143	3.1
Chi. & East. Ill.	27,796	24,999	I.	2,797	11.2
Chi. & G. Trunk.	61,690	45,068	I.	16.622	36 9
Chi., Mil. & St. P.	305.000	214,125	I.	90,875	44.9
Chi. & Northwest.	336.097	238,678	I.	97,419	40.8
Chi, St. P., M. & O.	81,400	45,900	I.	35,500	77.2
Denver & R. G.	96,100	100,400	D.	4,300	4.3
Long Island.	38,974	35,190	I.	3,784	10.8
Louis & Nash.	254,645	269,225	D.	14,580	5.4
Mil., L. S. & W.	16,060	13,910	I.	2,150	15.4
Rochester & Pitts.	22,041	5,369	I.	16,672	310.5
St. L. & San Fran.	76 200	53,400	I.	22,800	42.7
St P., M. & M.	96,880	90,180	I.	6,700	7.4
Year ending Dec. 31:	1883.	1882.			
Ches. & Ohio.	$3,906,792	$3,334,977	I.	$571,815	17.1
Net earnings.	1,353,299	1,032,528	I.	320,771	31.1
Chi., Bur. & Q.	26,110,369	21,550,805	I.	4.559,564	21.2
Net earnings.	13,329,739	10,882.464	I.	2,447,275	22.5
Eliz., Lex., & B. Sandy.	713,103	529.319	I.	183.784	34.8
Net earnings.	216,508	151.470	I.	65.038	43.1
Des M. & Ft. D.	341,935	347,168	D.	5,233	43.1
Net earnings.	94,799	104,076	D.	13.277	12.3
N. Y., Sus. & W.	1,003,661	723,437	I.	28,224	38.7
Oregon & Cal.	1.056,253	.. ..	..	.....	....
Net earnings.	327,457	.....	..	.....	....
Utah Central.	1,174,737	1,508.663	D.	333,926	22.1
Net earnings.	604,451	871,702	D.	267,251	30.6
Month of November:				
N. Y., L. E. & W.	2,180,982	1,818,824	I.	362,158	19.9
Net earnings.	703,078	757,206	D.	54,128	7.0
Month of December:				
Chi., Bur. & Q.	$2,170,918	$2,027,060	I.	$143 858	7 1
Net earnings.	1,171,790	1,266,418	D.	94,628	7.5
Des M. & Ft. D.	31,716	28,410	I.	3,316	11.7
N. Y., Sus. & W.	73,831	67,532	I.	6,309	9.4
Oregon & Cal.	100,200	.. ..	..	.....	....
Oregon Imp. Co.	271,462	309,831	D.	38,369	12.4
Net earnings.	60,435	71,812	D.	11,377	15.8
Utah Central.	93,470	117,245	D.	23,775	20.3

Weekly reports of earnings are generally estimated in part, and are subject to correction by later statements.

Grain Movement.

For the week ending Feb. 2 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1877.	1,477,302	970 548	1,975,509
1878.	2,699,954	2,405,538	3,680,912
1879.	2,863,091	1,631,013	3,626.153
1880.	2,999,037	1,431,079	1,842,321
1881.	3,050.080	1,632,348	2,149.442
1882.	4,869,688	3,082.260	2,010,570
1883.	5.414.875	3,229 918	3,000,976
1884.	4,723,868	2,304,750	2,310,427

Thus the receipts of the Northwestern markets for the week were 709,000 bushels less than in the corresponding week of last year and 146,000 less than in 1882, but larger than in any previous year. They were also 478,000 bushels less than in the previous week of this year. The shipments of these markets were less than in 1883, 1882, and also 1878, and smaller than for two weeks previous.

The receipts of the Atlantic ports were less than in 1883, 1879 and 1878, but the largest this winter since the middle of December.

The receipts at St. Louis in the week were the largest for six weeks; and the receipts at Peoria the largest since September.

The exports from Atlantic ports for the week ending Feb. 2, have been, for five years:

	1880	1881.	1882.	1883	1884.
Flour, bbls.	78,475	132,170	106,829	161,665	129,606
Grain, bu.	2,024,353	2,106,771	872,698	2,357 271	2,9:0 996

The shipments this year were more than in 1880 and 1882, and less than in the other years. Nearly 80 per cent. of the flour and 56 per cent. of the grain went from New York 36 per cent. of the grain from Baltimore.

Coal.

Anthracite coal tonnages for the month ending Feb 2, as given in the weekly reports of the companies and compiled from various sources, were as follows, the tonnage given in each case being only that originating upon the line to which it is credited:

	1884.	1883.	Inc. or Dec.	P. c.
Phil. & Reading } Central, of N. J. }	721,059	556,320 } 323,404 }	D.	58,665	6.7
Sun., Hazleton- & W.-B.	23,104	3,746	I.	19,358	...
North & West Branch	82,116	40,846	I.	41.270	102.0
Lehigh Valley.	430,235	434,835	D.	4,600	1.1
Penn. & N. Y.	14,198	15.038	D.	840	5.6
Del., Lac. & Wes.	234,420	350,070	D.	16,250	4 6
Del. & Hud. Can.	233 267	289.359	D.	56,092	19 3
Penn. Coal Co.	75,898	95,810	D.	19,912	20.7
State Line & Sullivan.	6,437	5,535	I.	902	16 4
Total anthracite.	1,920.734	2,115,563	D.	94,829	4.5

The tonnage of the Central Railroad of New Jersey is now

included in that of the Philadelphia & Reading, no separate report being made.

The total anthracite tonnage reported for the corresponding period for eight years has been as follows:

1884	1,920,734	1880	1,981,541
1883	2,115,563	1879	1,820,099
1882	2,100,480	1878	1,399,548
1881	1,819,921	1877	1,193,933

The total tonnages as given in the statements above differ somewhat from those given in the Official Accountant's statement, which appears a week or two later. This is unavoidable, from the way in which the statements are made up. The month of January this year was one of restricted production, which accounts for some of the changes.

Bituminous coal tonnages for the month ending Feb. 2 are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Barclay RR. & Coal Co...	32,085	35.383	D. 3,298	9.3
Huntingdon & Broad Top.	18,136	21,894	D. 3 758	17.1
Cumberland, all lines....	148,282	152,618	D. 4,336	2.8
Bellefonte & Snow Shoe..	21,607	28,180	D. 6,573	23.1
Clearfield....	248,157	240.106	I. 8.051	3.4
Mountain Region, P. R.R.	49,906	67.199	D. 17.293	25.8
West Penna R. R.....	39,382	49,262	D. 9,880	20.1
Southwest Pa. R. R.....	15,399	2,756	I 12.643	459 8
Penn and Westmoreland.	113,244	126,713	D. 13,469	10.6
Monongahela Reg..P. R.R.	15.774	49.063	D. 6,110	12.4
Pittsburgh R., Pa. R.R...	27,179			
Total bituminous.....	729,151	773,174	D. 44,023	5.7

With one or two exceptions the bituminous tonnages show decreases from last year.

Coke tonnages for the month ending Feb. 2 are reported as follows:

	1884	1883.	Inc. or Dec.	P.c
Bellefonte & Snow Shoe	2,084	1,099	I. 985	8.9
Mountain Region, Pa. RR.....	11,986	10,456	I. 1,530	14.6
West Penna. R. R.....	13,017	11.065	I. 1.952	17.7
Southwest Penna. R. R.....	191,181	195,855	D. 4,674	2.4
Penn and Westmoreland.....	18,858	28,544	D. 9,686	38.0
Monongahela R. Pittsburgh R. Pa. R. R....	7,203	.....	I. 7,203	....
Connellsville, *via* Pa. R. R. ..	24,589	96,829	D. 72.240	74.4
Total coke...	268,918	343,848	D. 74,930	21 8

The attempt to pool the coke product of the Connellsville Region has, it is said, failed, on account of the refusal of most of the individual operators to join in the proposed pool.

The coal tonnage of the Pennsylvania Railroad for the month (five weeks), ending Feb. 2, was as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Coal.....	876,903	809,792	I. 67.111	8.3
Coke.....	254.465	343,848	D. 89,383	26 0
Total....	1,131,368	1,153,640	D. 22,272	1.9

This includes all coal passing over the road, both that originating on the line and that received from other lines.

The shipments of the Southwest Virginia Improvement Co. over the New River Branch of the Norfolk & Western road from May 1 (when shipments first began) to Dec. 31, 1883, were: Coal, 76,614; coke, 25,282; total, 101,896 tons.

The coal tonnage passing over the Pennsylvania & New York road for the two months of its fiscal year from Dec. 1 to Feb. 3 was as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Anthracite.....	173,943	159,253	I. 14,690	9.2
Bituminous..	42,321	46,253	D. 3,932	8 4
Total.....	216,254	205,506	I. 10,758	5.2

The greater part of the anthracite is received from the Lehigh Valley road.

Cumberland coal shipments for the week ending Feb. 9 were 26,497 tons. The total shipments this year to Feb. 9 were 174,779 tons.

The report of the Illinois Bureau of Statistics for the year ending June 30, 1883, says that coal is mined in 49 counties in that state, and the whole number of mines is 639, covering an area of 110,368 acres, of which 12,589 acres have been worked out. These mines give employment to 23,939 persons, and in the year covered by the report produced 10,508,791 tons of coal, an increase of 1,393,138 tons over the year of 1882. The total value of the product of the mines is reported at $15,320,384, and the capital employed at $10,396,540.

San Francisco coal receipts in January were 72,659 tons, against 54,400 tons in January, 1883, an increase of 18,259 tons, or 33.6 per cent. Of the receipts this year 20,321 tons were English, 7,494 tons Australian, 2,314 tons Eastern and 42,530 tons Pacific Coast coal.

Cotton.

Cotton movement for the week ending Feb. 8 is reported as follows, in bales:

	1884.	1883.	Inc. or Dec.	P. c.
Interior Markets:				
Receipts.....	63,169	88,523	D. 15,354	17.2
Shipments.....	80,448	92,402	D. 11,954	13.0
Stock, Feb. 8.....	282,475	343,584	D. 61,109	17.5
Seaports:				
Receipts	111,481	165,868	D. 54.387	32.8
Exports.....	116.110	130,864	D. 14,754	11.2
Stock, Feb. 9.....	1,043,772	917,087	I. 126,685	13.8

The stock at interior markets decreased 17,279 bales during the week, and that at the seaports decreased 16,791 bales. The total receipts at interior markets for the cotton year, (from Sept. 1) to Feb. 8 were 2,417,605 bales; at seaports, 4,092,797 bales.

Florida Orange Shipments.

Large shipments of oranges are now being sent from Florida by rail. A special train has been put on to carry them, running *via* Jesup, Atlanta, Chattanooga and Cincinnati. The express freight by this line makes the run from Jacksonville to Cincinnati in 69 hours, the distance being 839 miles.

Through Freight Over the Southern Pacific.

The Atchison, Topeka & Santa Fe on Feb. 9 issued a circular announcing that it would transport through California freight in connection with the Southern Pacific from Kansas City, Atchison or Denver without breaking bulk. Owing to the close relations of the Atchison with the Chicago, Burlington & Quincy it is reported that the latter company will be included in the through car service by the Southern route, making a through line opposed to the Union Pacific, but this has been contradicted.

Missouri River Lumber Rates.

It is but a few days since the railroads interested in the Missouri river lumber traffic met in Chicago and decided to put an end to the disastrous war on lumber rates that had been going on for several years past. A committee of seven general freight agents was appointed to agree upon differential rates from the various points of supply, and it was agreed that, pending the action of the committee, rates should be maintained on the basis of 15 cents per 100 pounds. But already new complications have arisen that make it doubtful whether harmony between the various roads on lumber rates can ever be restored. Commissioner Midgley has secured positive evidence that some of the roads were violating the agreement to maintain a 15 cent rate until the committee was ready to report, and, being unable to prevail upon those roads to maintain the agreed rate, he gave orders Tuesday to reduce lumber rates from Chicago to southwestern Missouri River points to 10 cents per 100 pounds, and to 8 cents from Mississippi River points. Under these circumstances it is hardly probable that the committee appointed at the meeting held in Chicago a week or two ago to agree upon differential rates will take any action in the matter for the present, as there is no longer any probability that harmonious action on their report could be secured.—*Chicago Tribune.*

Boston Traffic Notes.

The transfer of freight cars across the Hudson from Newburg in January to Fishkill reached a total of 3,656 cars, while the movement from Fishkill to Newburg was 4,720, including 946 loaded cars. The movement eastward showed an increase of 603 cars over January, 1883.

The number of freight cars that came through the Hoosac Tunnel in January, going eastward, was 5,157, a decrease of 973 from the corresponding month last year; going westward 6,000, of which 3,530 were empty.

Through Sleeping Cars Between Chicago and Ogden.

The negotiations regarding the running of through sleeping cars from Chicago to Ogden have, it is understood, been practically successful, the Pullman Co. having withdrawn its objections to the running of Wagner cars over the Union Pacific, while the Wagner Co. in like manner has withdrawn its objections to running Pullman cars over the Chicago & Northwestern. The new arrangement will take effect as soon as the Wagner Co. has sufficient cars provided. Through sleepers will run from Chicago to Denver over the Northwestern and the Union Pacific about March 1, and to San Francisco about April 1. The cars will run alternately. The train leaving Chicago one day carrying Wagner cars and the next day Pullman cars.

OLD AND NEW ROADS.

Atlantic & Danville.—The track on this road is now laid to the crossing of the Norfolk & Western at Waverly, Va., a distance of 17 miles from the starting point at Claremont Landing, on the James River. The first train reached Waverly Feb. 7. Work is progressing on the extension of the road westward.

Baltimore & Ohio.—This company has a bill before the Maryland Legislature authorizing it to build a branch or lateral road in any direction in connection with its Philadelphia Branch. The bill covers the construction of a road through the city of Baltimore and provides for the condemnation of the necessary lands. It does not specify whether the line through the city is to be a surface or an elevated railroad, but it provides that no line should be built around, under, or above any of the streets of that city, except in such manner as may be approved by the Mayor and the city council:

It is said that the company's plan is to connect its Philadelphia Branch with the main line at Camden Station in Baltimore by a tunnel passing under Patterson Park and thence by an elevated road through Pratt street. It is thought that this branch line will meet with much opposition from the owners of property. The bill, however, may be materially amended before it passes.

Boston & Albany.—Work upon the Newton Circuit branch from Riverside, Mass., to Newton Highlands, will be begun early in March. The differences between the company and the city government of Newton have been settled and the engineers are now at work locating the lines of the new branch.

Boston, Concord & Montreal.—The Boston *Advertiser* of Feb. 11 says: "Rumors are in circulation that the next May dividend of the Boston, Concord & Montreal Railroad will probably be passed, that the Pemigewasset Railroad is not paying running expenses, and that the question of the legality of the lease will sooner or later be tested. On the other hand, the correspondent of the *Journal* is authorized to state that the earnings for 1883 were fully up to the preceding year, and the corporation is as able now to pay dividends on its preferred stock as it has been for some time past; that, however, the expediency of declaring such dividends, in view of the indebtedness of the road has been under consideration by the directors, and that the board is not unanimous on the subject; that those members who advocate the passing of the dividends for the present believe that such a course would strengthen the financial condition of the corporation, and in the end would work no injury to the owners of preferred stock. It is further stated that the income from the Pemigewasset road has been thus far, as was expected, not large, but that a considerable increase during the coming year is confidently predicted. In this last view of the matter there would seem to be no reasonable ground for alarm on the part of the preferred stockholders."

Boston & Lowell.—The Boston *Advertiser* of Feb. 12 says: "It is reported that some considerable changes are soon to be made in the line of the Boston & Lowell Railroad. The people of Woburn and Cummingsville have for some time been desirous of more and faster passenger trains and better freight accommodations. Negotiations have been going on quietly for several weeks, and it is now reported that a line of track is to be built through Woburn and Cummingsville and thence onward to Wilmington. This will give the tanners in Cummingsville a freight line connecting with the north and south, giving them at once increased facilities for getting material from Canada and Vermont and for sending their finished product in any direction. The land for the new track has already been bonded in many places, and the Lowell road is said to have promised to spend $50,000 at once. The Woburn people believe that before long the new route will be double-tracked and a good proportion, if not all, the express trains run over it, thus supplying Woburn with the numerous and fast trains which she desires.

"It is also reported that the Lowell road intends to connect Arlington and West Medford by a circuit road running over the old main road and the Arlington Branch."

Boston & Maine.—The double track on this line is now finished to Pine Point, Maine, 107 miles from Boston. It is now thought that the entire second track will be completed and in running order to Portland by the middle of next June.

Bullion.—This company has been organized to build a railroad from Cinnabar, Montana, on the Yellowstone Park Branch of the Northern Pacific, eastward to Cooke City, about 40 miles. The incorporators are: George O. Eaton and George A. Houston, of Cooke City; D. E. Fogarty and F. D. Pease, of Livingston; and George Haldron, of Billings, Montana.

Burlington, Cedar Rapids & Northern.—This company's engineers are making the final location of the proposed extension through Dakota to Bismarck. It is said that they are not satisfied with the lines run last fall and it is thought a new survey will be made on the whole line. The company has agreed to build the extension as far as Laverne, Minn., next summer, provided that town gives a bonus of $15,000. Other towns on the line have been also asked to vote a tax.

Carolina, Cumberland Gap & Chicago.—The attempt to negotiate the bonds of this company in England has met with no success, as might have been expected, and the company will now try to build at least a portion of the road by means of those subscriptions. Aiken, S. C., as the starting point of the road, has been asked for $30,000 and the present plan is to grade the road and lay the track from Aiken to the foot of the mountains. It is thought that the company will then be able to negotiate bonds having some completed road as a basis. From Aiken to the mountains the construction will be comparatively cheap.

Chesapeake & Ohio.—This company's statement shows for December and the year ending Dec. 31 the following earnings:

	December.		Year.	
	1883.	1882.	1883.	1882.
Earnings. ...	$306,385	$253,356	$3,906,702	$3,354,977
Expenses.	211,472	186.008	2,553,493	2,302,449
Net earnings...	$94.913	$67.348	$1,3 3,299	$1,032,528
Per cent. of exps.	69.0	73.4	65 3	69.0

This shows for the year an increase of $571 815, or 17.1 per cent., in gross earnings and an increase of $251,044, or 10.9 per cent., in expenses, the result being a gain in net earnings of $320,771, or 31.1 per cent.

The statement for the controlled Elizabethtown, Lexington & Big Sandy road is as follows:

	December.		Year.	
	1883.	1882.	1883.	1882.
Earnings..... ...	$51.530	$47,090	$713,103	$529,319
Expenses.....	40,575	47,619	496,595	377.849
Net earnings	$10,955	$529*	$216,508	$151,470
Per cent. of exps... ..	78.8	101.3	69.6	71.4

* Deficit.

This shows for the year an increase of $183,784, or 34.7 per cent., in gross earnings, with an increase of $118.746, or 31.4 per cent. in expenses, and a resulting gain in net earnings of $65 038, or 42 9 per cent.

Chicago, Burlington & Quincy.—This company's statement gives the following figures for December and the year ending Dec. 31:

	December.		Year.	
	1883.	1882.	1883.	1882.
Earnings.... ...	$2,170,918	$2,027,060	$26.110. 09	$21,550,805
Expenses	999,128	760,642	12.780,630	10,668,541
Net earnings.	$1.171,790	$1,266,418	$13,329.739	$10,882,464
P'r cent of exps.	46.0	37 5	48.9	49.5

For the year this shows an increase of $4,559,564, or 21.2 per cent., in gross earnings, with an increase of $2,112,289, or 19.8 per cent., in expenses, and a resulting gain in net earnings of $2,447,275, or 22.5 per cent.

Chicago & Evanston.—A petition for an injunction to enjoin this company from building a bridge over the Chicago River was denied in the Superior Court in Chicago Feb. 11. An appeal was taken to the Supreme Court. The bridge is necessary for the entrance of the road into the city.

Chicago, St. Louis & Pittsburgh.—Notice is given to the holders of the following prior lien bonds: Toledo, Logansport & Burlington first mortgage; Toledo, Logansport & Burlington income, that this company will be prepared to pay off in cash the principal and accrued interest of the above-named bonds at the office of the Union Trust Co. of New York on and after Feb. 1, 1884.

Chicago, St. Paul, Minneapolis & Omaha.—This company has caused the organization of a subordinate company to build a branch from its line in Douglass County, Wis., to a point on St. Louis Bay, a distance of about 10 miles.

Cincinnati Southern & Clinton.—This company has been organized to build a railroad from a point on the Cincinnati Southern road, in Morgan County, Tenn., 86 miles north of Chattanooga, by Peach Orchard Creek to the dividing ridge, across to the Little Emery River, and thence to the West Fork and Crooked Fork valleys to Stevens Gap, and through a gap in Walden's Ridge to the Knoxville & Ohio Railroad at Clinton, in Anderson County. The object of the organization is to make an outlet for the coal mines around the upper waters of the Crooked Fork Creek. This coal-field has been pretty thoroughly examined, and is believed to contain a large quantity of coal of fine quality.

Danville, Olney & Ohio River.—A meeting of bondholders was held in Boston Feb. 7, at which a majority approved the plan of reorganization presented by Mr. Corbin, and announced themselves as opposed to the plan prepared by the Boston committee. Holders of about $75,000 of bonds agreed to unite in the Corbin plan, in addition to those who have already subscribed to it.

Delaware & Hudson Canal.—In a suit brought by this company to have the valuation of its property in Ulster County, N. Y., reduced, several of the officers have testified that the canal as a transportation line was worth little or nothing, because it costs more to transport coal by the canal than it would by rail. The only intrinsic value of the property was the right of way and grading which it gives the company for building a railroad from Honesdale, Pa., to the Hudson River, which is a future possibility. For that purpose the President said it was worth from $5,000 to $8,000 per mile. It has been several times reported that the company intended to build a railroad on the tow-path of the canal, and to do away with the canal transportation altogether, and the testimony thus given has revived these reports. It is not probable, however, that anything in this way will be done at present.

East & West, of Alabama.—The statement of this company shows that the earnings of the Georgia Division, from Cartersville, Ga., to Cedartown, for the year 1883, were as follows:

Earnings ($2.154 per mile)	$79,717
Expenses (54.7 per cent.)	43,609
Net earnings ($976 per mile)	$36,108

The Alabama Division was not completed until near the close of the year, so that its earnings cannot be stated.

Erie & Sheffield.—It is proposed to build a railroad from Erie, Pa., to Sheffield, by Northeast and Jamestown, N. Y., and Chautauqua Lake. The projectors of the enterprise are residents of Erie and Jamestown, and the object of building the road is to secure some of the profits of the heavy summer travel to Chautauqua Lake and also some freight from the prosperous dairy regions along the coast line.

Fitchburg.—The Boston *Advertiser* says: "The color of this company's passenger coaches is hereafter to be dark olive. The 8:30 a. m. west-bound express now meets the

new requirements. The drawing-room cars are new, and the other cars have just come from the shops, where they have been thoroughly renovated, newly upholstered and repaired. Local and express trains both are hereafter to be made in this fashion, and the result will be likely to meet the general approval of passengers over the road. It is announced that a number of important changes have just been made in the company's car shops at Charlestown."

Floods in the Ohio.—The heavy rains of last week, falling upon frozen ground, have resulted in disastrous floods in the Ohio River and its tributaries, under very nearly the same conditions as the great flood of a year ago. Serious damage began at Pittsburgh, where a part of the city was inundated, doing much damage to railroad property and almost stopping the movement of trains for two or three days. Below Pittsburgh the bridge of the Pittsburgh and Lake Erie road at Beaver was carried away and other serious damage done. At Wheeling the Baltimore & Ohio suffered considerably, losing part of its shops, which were carried away. At Cincinnati the railroads suffered much loss, the water reaching a higher point than in 1882. At the present date all the railroads entering the city have been compelled to stop running trains, except the Cincinnati, Hamilton & Dayton, and the water has reached the tracks of that road at several points. It is now the only railroad running trains into the city. The Ohio & Mississippi and the Cincinnati, Indianapolis, St. Louis & Chicago suffered loss of bridges and wash-outs west of Cincinnati and a complete stoppage of traffic. At Louisville the damage has been less, but at the smaller towns along the river it has been very great, and the total loss to the railroads from destruction of bridges, washing of road-beds and stoppage of traffic must have reached a large amount.

The heavy rains extended west of the Mississippi and very high water is reported in the Arkansas, White, St. Francis and other tributary rivers. The Mississippi is also reported as very high below Cairo and much damage is feared. The work on the new Louisville, New Orleans & Texas road has been stopped at several points by high water, while the Iron Mountain and the Kansas City, Springfield & Memphis roads in Arkansas have been damaged at several points by the overflow of the rivers. There damage still is expected, as the floods have not yet begun to go down.

Gainesville Jefferson & Southern.—Track laying on this road has begun on the Southern end at Walton, Ga., and is being pushed as fast as possible. On the northern end the rails are now laid to the Appalachee River, and the bridge over that stream is nearly completed.

Hartford & Harlem.—The Connecticut Superior Court on Feb. 8 gave a decision overruling the motion to quash the writ of *quo warranto* applied for against this company. The suit will now be tried on its merits.

Houston & Fort Worth.—The latest Texas project is for a direct line from Houston to Fort Worth. The line proposed runs through Montgomery, Walker and Madison counties to Centreville and thence through Freestone and Ellis counties to Fort Worth. Branches are also proposed from Centreville to Paris, and from some point in Madison County to a connection with the Houston, East & West Texas road, the object of the last named branch being to reach the Texas lumber belt. The main line and branches will be about 540 miles long, and the projectors are already asking for county subscriptions.

Illinois Central.—This company's statement of gross earnings for January is as follows, the estimated returns for this year being compared with the actual earnings for 1883:

	1884.	1883.	Inc. or Dec.	P.c.
Ill. and Southern divs.	$792,852	$979.717	D. $186,865	19.1
Iowa lines.....	127,104	121,942	I. 5,162	4.2
Total.....	$919,956	$1,101,659	D. $181,703	16.5

The earnings of the Illinois lines and the Southern Division are now reported together.

The Land Department reports for January sales of 1,543.11 acres for $6,969.61. The cash collections were $9,841.72 for the month.

Work is progressing well on the Canton, Aberdeen & Nashville branch of the Southern Division. The long cut at Blanton Gap, which has caused considerable delay, is very nearly finished and the track-laying to Aberdeen is again in progress. The bridge work is nearly ready. Surveys are to be made for an extension of this branch from Aberdeen, Miss., northward.

Indianapolis, Eel River & Southwestern.—This company has, it is said, secured means to begin work upon the road, and a force of men will be put upon the grading as soon as the weather will permit. The contracts have also been let for ties. Most of the right of way is secured and the surveys were made some time ago. The proposed line is from Clay City, Ind., on the Terre Haute & Southeastern road, to Indianapolis, a distance of 62 miles.

Kentucky Central.—The Cincinnati *News-Journal* says that the stockholders outside of the Chesapeake & Ohio do not like the proposed plan to assess the stockholders 10 per cent. in order to pay off the floating debt and to build an extension of the road is proposed. It is thought that fully one-fifth of the stockholders will refuse to pay the assessments or any part of the assessment on the basis proposed. It is admitted that the company is in need of a large sum of money, and that the expenditure would considerably increase its earning capacity, but the minority stockholders believe that it should be raised in some other way. Still they have expressed their willingness to take their proportion of an issue of preferred stock or the income bonds, and will urge the adoption of some such plan; otherwise they say that the Chesapeake & Ohio people should furnish the money needed.

Lehigh Coal & Navigation Co.—It is understood that the forthcoming annual report of this company will make a very favorable showing, and it is estimated that the rental to be received for the railroad lines alone will be more than sufficient to pay all the fixed charges. The fixed charges for next year will be considerably reduced by the extension of the first mortgage sixes at 4½ per cent., and also by the reduction in rental of some of the leased lines. The floating debt has been reduced to a small amount, and this remaining debt is all in the shape of time loans for which the company will be able to make provision without difficulty.

Lehigh Valley.—The report of a lease of this road to the Pennsylvania Railroad Co. is renewed. It is now said that the negotiations had been delayed by the illness of the late President Harry E. Packer, and that since his death they have been closed and terms agreed on. The report needs further confirmation.

Louisville, New Orleans & Texas.—Up to Feb. 6 the track on this road has been laid from Memphis, Tenn., southward 63 miles; from Vicksburg, Miss., north 59 miles and southward 50 miles and from New Orleans northward 108 miles, making a total of 280 miles. This leaves two gaps in the line, one of 96 miles, between the Vicksburg and Memphis divisions, and one of 77 miles between Vicksburg and New Orleans. A large part of the grading is completed on these gaps and the principal work remaining to be done is on the bridges, the most important being the iron bridge over the Yazoo River, which it is expected will be finished by March 1. Should the weather be favorable the officers of the road expect that the track will be laid and trains will be able to run from New Orleans to Memphis early in May.

Macon, St. Johns & Gulf.—This company has been organized to build a railroad from Macon, Ga., southward to the Florida line and thence to a connection with the Florida Central & Western and other roads. The line proposed is very nearly the same as that of the Macon & Florida Air Line, which was organized a few months ago.

Memphis & Little Rock.—In the suit brought by this company in the United States Circuit Court in New York against R. K. Dow, trustee, and holders of the first-mortgage bonds the Court has given a decision. The suit was brought to annul the bonds and to set aside the mortgage on the ground that they were issued by the complainant without corporate board. The primary question in the suit was whether, on the purchase of property, a corporation could mortgage what it had acquired in order to secure the purchase money. The present company was organized in 1872, under a special act passed by the Legislature of Arkansas and succeeded to the property of a previous company of the same name, which was then sold on the foreclosure of the mortgage. The new company issued stock to represent the unpaid interest on the old bonds and new bonds representing the amount of the old bonds. The majority of the stock has since been bought by Messrs. Gould & Sage in the interest of the St. Louis, Iron Mountain & Southern Co. In the decision the Court held that the rights of a corporation were the same as those of an individual in this respect. The general right to borrow money on a mortgage of the corporate property is incident to the corporation, unless it is specially prohibited from doing so by its charter. In this case there seems to be no reason to doubt the power of the company to execute the mortgage as purchaser and to include all its property. The Court therefore dismissed the case, with costs to the plaintiff. In his opinion Judge Wallace said:

"The case is phenomenal in the audacity of the attempt to induce a court in equity to assist a corporation in repudiating its obligations to its creditors, without offering to them the property it acquired by its unauthorized contract with them. The fundamental maxim is that he who seeks equity must do equity. Every stockholder of the corporation, when he acquired his stock, took it with notice explicitly embodied in his certificate that his interest as a stockholder was subordinate to the rights of the holders of the mortgage bonds. It is now contended that if there is any obligation on the part of the corporation to pay for the property it purchased it is not to pay what it agreed to, but to pay a less consideration because the property was not worth the price agreed to be paid. The court will not compel the bondholders to enter into any such inquiry. They were entitled to set their own value on their own property. When the complainant offers to recover the property in consideration of which it created its mortgage bonds it will have taken the first step toward reaching a position which may entitle it to be heard."

Mexican Central.—The loan of $1,000,000 asked for by this company in Boston was closed Feb. 8. Officers of the company state that the amount of subscriptions considerably exceeds the amount called for. The work on the road is being pushed, and advices from the General Manager are to the effect that 690 miles of the main track are now completed, and that the road will be certainly finished in March, as has been before stated.

Mexican National.—This company obtained in May last a loan of $2,000,000, secured by a deposit of stock and bonds of the company. The terms on which the loan was obtained were that the money should be repaid not later than Sept. 15, 1884, and that as soon as each subscriber had put in the last installment of his subscription he should be entitled to receive from the trustees a certificate showing his interest in the loan. A suit has been brought in the New York Supreme Court by a subscriber, who claims that he subscribed $25,000 and paid his last installment on it Oct. 1 last. He claims that he was not then given a certificate, but that on making application the Treasurer of the company informed him that he could have a certificate from the trustee which contained a provision under which a majority in the interest of the subscribers to the loan should have the power to extend the time for the payment of interest or principal. He demanded a certificate in accordance with the terms as they were originally stated in the first circular, but did not receive it, and he now brings suit to recover his money.

Mississippi Railroad Commission.—A bill providing for the creation of a railroad commission has passed the lower House of the Mississippi Legislature and has been considerably amended by the Senate. It is now before the lower House in its amended form. It provides for the appointment of three railroad commissioners who are to have power to fix rates and to make rules for the government of the railroads. Its provisions are very much like those of the Georgia Commission which seems to have served as a model for all Southern states which have so far adopted railroad commissions.

New York & Boston Inland.—The officers of this company state that work is not to be abandoned on account of the failure of the first organization. A new company will be organized and measures taken to secure the commencement of work on the road. It does not, however, appear probable at present that the new organization will amount to any more than the first, unless it is placed on a different basis.

New York, Lake Erie & Western.—This company's statement for November and the two months of its fiscal year from Oct. 1 to Nov. 30 is as follows:

	November.		Two months.	
	1883.	1882.	1883.	1882.
Earnings.....	$2,180,982	$1,818,824	$4,592,128	$3,637,834
Expenses.....	1,477,904	1,061,618	3,055,682	2,237,299
Net earnings ...	$703,078	$757,206	$1,546,446	$1,400,535

For the two months this shows an increase of $954,294, or 26.2 per cent., in gross earnings, with an increase of $808,383, or 36.1 per cent., in expenses, and a resulting gain in net earnings of $145,911, or 10.4 per cent. As heretofore, since the lease, the gross earnings include 68 per cent. of the gross earnings of the New York, Pennsylvania & Ohio, while the expenses include all the expenses of the leased line.

New York City & Northern.—The Central Trust Co., of New York, has begun a suit against this company to foreclose the $4,000,000 consolidated mortgage, and made application Feb. 12 to Judge Donohue for the appointment of a receiver in place of Arthur Leary, who was made Receiver in May, 1882. The trust company alleges that Mr. Leary has not managed the property as he should have done. The defense in the suit is that the mortgage was fraudulently created, and is not a legal claim upon the road.

New York & New England.—The Connecticut House of Representatives has voted unanimously not to release or defer the collection of the taxes due the state by this company.

In the United States District Court at Hartford, Feb. 9, before Judge Shipman, argument was heard on the motion of Colonel Jonas H. French, a director of the company, asking that the receivership should be terminated or that a new receiver be appointed. An application was also presented from certain second-mortgage bondholders to be joined with Col. French's petition. After a long discussion this was withdrawn as being defective in form, and a substitute will be presented. A supplemental bill was also presented, alleging failure to pay the interest on the second-mortgage bonds and asking the court to foreclose that mortgage. The hearing was postponed until Feb 18, when the court will probably take final action in the matter.

The court granted an order allowing Receiver Clarke to pay certain classes of claims, including taxes, which are, or may become, liens upon the property, rents which if unpaid would cause forfeiture of leases or of estate, sums due shippers for overcharges, and payments necessary to continue the work already begun on the second track.

New York, New Haven & Hartford.—The final location is being made on proposed branch to Savin Rock and West Haven, Conn., and it is said that the construction of this branch will begin as soon as the weather will permit.

New York, Ontario & Western.—The committee selected to arbitrate the difficulties between Conrad N. Jordan, late Treasurer, and the company, have completed their work and made a report in which they say that from statements made to them they are compelled to believe that the information which it was important for the Treasurer to possess in relation to the affairs of the company was not communicated to Mr. Jordan during a large part of the three years in which he held his office and that many of the present difficulties would have been avoided had there been more free communication and consultation between the officers. They say that it is due to Gen. Winslow to state that he was not aware of such neglect, the pressure of his duties so absorbing his time as to prevent his conferring with others as he would have wished to do. The committee say that in their opinion with the information possessed by Mr. Jordan he was justified in making an attempt to perfect the interests of the stockholders by applying for the appointment of a receiver, but that with a more full knowledge of the case he should withdraw such application. They also report that while Mr. Jordan has no absolute claim it would be an act of justice that a satisfactory settlement of his salary be made.

New York, West Shore & Buffalo.—A number of the large holders of stock and bonds of this company have, it is understood, agreed on measures for raising the money needed to put the track in good condition for traffic. The amount needed is said to be about $4,500,000, of which $1,500,000 will be used to put the Western Division of the road in good condition, and build second tracks, and about $3,000 000 for additional equipment. The additional equipment it is said can be obtained without difficulty under a car trust agreement. The remainder of the money will be subscribed by the stockholders and bondholders but it has not yet been decided what sort of securities will be issued to them. It is also proposed to ask the bondholders to fund three coupons on the first mortgage bonds in order that the company may be able to use all the earnings for improvements on the road and for the necessary payments on the car trust. This funding plan has as yet only been proposed unofficially and the company has taken no steps to carry it out.

Two other plans are said to be under consideration. The first is for the issue of $60,000,000 in general mortgage bonds, the proceeds of which are to be used to retire the present bonds and also the terminal bonds, the balance remaining to be used for the completion of the road and other purposes. This plan would seem to involve the purchase of the present bonds at market price or thereabouts. Another plan said to be under consideration is the funding of two years' coupons on the present first-mortgage bonds in 6 per cent. securities of some kind and for the issue of $30,000,000 in second-mortgage bonds, in two classes, one half to be a first mortgage on the terminal property and to be used in retiring the outstanding terminal bonds and the other half to be issued as occasion may require. Nothing official has been given out regarding any of the proposed plans.

The Chancellor of New Jersey has made an order permitting the Receiver of the North River Construction Co. to pay the laborers who were in the employ of the company on Jan. 1, their wages for December. The Receiver stated that the laborers were all in the employ of the construction company the whole period for which wages were claimed, and that the portions of the road on which they were employed were not transferred to the railroad company until Jan. 1. The order was opposed on the ground that the laborers were not in the employ of the company at the date when insolvency took place. The Chancellor, however, granted an order which will permit the payment of about $70,000 to the laborers who have been waiting very anxiously for their money, and some of whom in the neighborhood of Buffalo have been inclined to be riotous.

Northern Pacific.—It is said that the Oregon Railway & Navigation Co. has given notice to the Northern Pacific of its desire to terminate the traffic agreement entered upon between the two companies three years ago, by virtue of which the former company agreed to give the latter an advantage equal to about 66 miles in 200 in the transportation of freight between Portland & Wallula Junction, and in proportion for shorter distances. The agreement provided that in any settlement of *pro rata* traffic there should be an arbitrary addition of 66 miles to the share of the Northern Pacific on all freight carried over the main line of the Oregon Co., whether the distance over the Northern Pacific be longer or shorter. This was equal to one-third the customary mileage proportion, and was conceded for the purpose of acquiring the Northern Pacific's right of way on the south bank of the Columbia River, which was conveyed to the Oregon Company at the same time. The agreement also provided for an additional percentage to accrue to the Northern Pacific on interchange of traffic, arranged on a sliding scale, the maximum being 7½ per cent. when the interchange should reach 8,000 tons per month. This percentage was to include passenger as well as freight, and was subject to a yearly readjustment. The contract was to be perpetual except in case the Northern Pacific should build a line of road along the north side of the Columbia River to Portland or beyond. The desire of the Oregon Railway & Navigation Co. to terminate the contract may therefore be considered not as a demand but as a movement to secure a new contract on better terms and has probably been brought about by the prospect of a new eastern connection by the completion of the Union Pacific's Oregon Short Line.

Philadelphia & Reading.—In the old suit of the government against this company, the United States Circuit Court has decided that the wages scrip issued in 1878 and

1879 was intended merely as an evidence of indebtedness, and not as a circulating medium, and consequently was not taxable within the meaning of the law providing for a tax of 10 per cent. on circulating notes. The injunction restraining the collection of the tax was made permanent.

Philadelphia, Wilmington & Baltimore.—This company has applied to the Maryland Legislature for a bill amending its charter so as to relieve the company from stopping all but four trains per day each way at Havre de Grace and Perryville. It will be remembered that when the company obtained authority to build a bridge over the Susquehanna in place of the ferry which had previously been used, an agreement was made by which all trains were to stop on each side of the river, and passengers between the two towns were to be carried across the bridge without charge. The company does not desire to be exempted from any part of its agreement except the obligation to stop all trains. It is willing to stop local trains, but it desires to run its through express trains over the bridge without stoppage. On behalf of the company it is urged that the number of trains now run even without the through trains is much greater than at the time the bridge was built.

Pottsville & Mahanoy.—In Pottsville, Pa., Feb. 9, the Philadelphia & Reading Co. made another move in its fight to keep this new road out of the city. A large force of workmen ostensibly employed by the People's Railroad Co. began laying tracks on the several streets, evidently with the intention of forestalling the new road. The charter of the People's Railroad Co., it is claimed, permits them to lay tracks on any street in Pottsville, and the Reading recently purchased a controlling interest of the stock of this company.

Rochester & Pittsburgh.—The walls of the new shops at Bradford, Pa. are completed and workmen are now engaged in putting up the iron roof. The work is advancing as rapidly as the weather will permit, but the shops will probably not be ready for use before spring.

St. Louis, Belleville & Eastern.—This company has been organized to build a railroad from Belleville, Ill., to East St. Louis. If built, this road will be the fourth line between those two places.

St. Louis, Hannibal & Keokuk.—In St. Louis, Feb. 7, the United States District Court granted the application made last week for the appointment of a receiver, pending a suit for the foreclosure of the mortgages.

San Francisco, Winnipeg & Hudson Bay.—A bill has been introduced into the Canadian Parliament to incorporate a company under this name to build a railroad from Winnipeg, Manitoba, to Hudson Bay, passing east of the Red River and Lake Winnipeg. The government is asked to give the company 12,000 acres per mile, but the bill does not provide for any money subsidy. This is a revival of the project which has been under discussion for several years for a connection for the Canadian Northwest via Hudson Bay.

Securities on the New York Stock Exchange.—The Governing Committee of the New York Stock Exchange has placed the following securities on the lists:

Louisiana Western, $2,240,000 first-mortgage 6 per cent. bonds.

Oregon & California, $1,000,000 additional first-mortgage 6 per cent. bonds.

Pennsylvania Company, $2,500,000 additional 4½ per cent. first-mortgage bonds.

South Alabama.—It is proposed to build a railroad from Pollard, Ala., on the Mobile & Montgomery road east by north through Elba, Ozark and Abbeville, to Fort Gaines, a distance of about 135 miles. The projected line is through a poor and thinly settled country.

Southeastern of Canada.—The latest proposal in relation to this company is to build a branch or extension from Sorel, P. Q., to Point Levis, opposite Quebec, in order to give the road a direct connection with the Intercolonial. The government will be asked for a subsidy of $12,000 per mile.

Union Pacific.—The track on the Oregon Short Line is now laid to Weiser, Idaho, 17 miles beyond the last point reported, and 514 miles from the junction with the main line at Granger, Wyoming. Weiser is 28 miles from Huntington, Oregon, which is to be the terminus of the road and its point of connection with the Oregon Railway & Navigation Co. lines., and the grading is all finished.

The Omaha *Herald* says that one year ago there was not a village or town, with the one exception of Soda Springs, between Granger, Wyoming and Ontario, Oregon. Now the line is dotted with the following embryo towns:

"Twin Creeks and Cokeville, Wyoming, Pocatello, Shoshone, Caldwell and Weiser, Idaho. Twin Creeks has about 300 inhabitants; Cokeville, 150; Pocatello, 300; Shoshone, 1,000; Caldwell, 400; and Weiser, which has just begun to feel the influence of the railway boom, numbers about 300 souls. The latter place at present seems to be the objective point for town lot speculators, embryo merchants and bonanza saloon men."

Utah Eastern.—A meeting of stockholders of this company was held in Salt Lake City last week, most of the individual stockholders being present. After some discussion, it was resolved to appoint a committee to investigate the condition of the road and to ascertain how fur it has been operated in the interest of the minority stockholders, and to report the results of their investigation to an adjourned meeting.

Virginia Midland.—Ties have been distributed and other preparations made for changing the Franklin Branch from 3 ft. gauge to the standard. The amount of traffic of this branch has grown so much that the cost of transfer at the junction to the main line has become an item of considerable amount and the company has decided that there will be a saving in expense resulting from the change of gauge.

If the agreement between the Richmond & Danville and the city of Baltimore is concluded the money loaned by the city will be largely used for laying steel rails on this road and increasing its motive power. A new and closer connection will also be established between this road and the Baltimore & Ohio in Washington which will be operated under an agreement between the two companies.

West Virginia & Pennsylvania.—At a meeting of the stockholders in Fairmont, W. Va., Feb. 5, the directors were authorized to make a contract for the construction of the road and to issue bonds. They were also authorized to make a traffic contract with the Pennsylvania Railroad Co. or to lease the road to that company when completed. The proposed line is to run from Fairmont, W. Va., northward to a connection with the Southwestern Branch of the Pennsylvania Railroad at Olyphant.

Windsor & Annapolis.—This company will ask the government of Canada for assistance in building an extension of the road from Annapolis, N. S., to Digby, to complete the connection with the Western Counties road to Yarmouth.

Zanesville, McConnellsville & Pomeroy.—The contract for building this railroad from Zanesville, O., to Pomeroy, on the Ohio River, has been let to a concern known as the United States States Construction Co. Work is to be begun April 1 and payment is to be made to the contractors in the securities of the company.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette*:

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New York, Pennsylvania & Ohio.

The latest report of this company covers a period of nine months, from Jan. 1 to Sept. 30, the fiscal year having been changed to end with September instead of December. The mileage worked was not changed during the year.

For four months, from Jan. 1 to April 30, 1883, the road was operated by the company. For five months, May 1 to Sept. 30, it was worked by the New York, Lake Erie & Western Co. under the lease which took effect May 1, 1883. The terms of this lease are noted elsewhere.

The general account is as follows, condensed:

Common stock		$34,999,350.00
Preferred stock		10,000,000.00
Funded debt		91,842,000.00
Deferred warrants		1,607,047.50
Special fund for additions		290,764.91
Accounts and balances, accrued interest, etc.		997,667.60
Interest for which funds are deposited		207,290.49
Surplus for first-mortgage coupons		41,702.01
Total		$140,045,822.51
Road and property	$138,520,774.86	
Sharon Railway stock	197,776 00	
Due on rental account	729,386.93	
Accounts and balances	330,504 23	
Cash deposited to pay coupons	267,290.49	
		140,045,822.51

Cost of road and property includes a charge of $141,319 for Sharon Railway stock acquired at the time of the purchase of the road. This is in addition to the Sharon stock credited in the account elsewhere.

The funded debt includes $8,000,000 prior lien bonds, on which interest is payable in cash; $39,842,000 first-mortgage bonds, on which each part of the interest as the earnings permit is paid in cash, the balance is deferred warrants exchangeable for new bonds; $14,500,000 second-mortgage bonds and $30,000,000 third-mortgage bonds, on which interest is payable only when earned.

The earnings and expenses for the nine months were as follows:

	Four months, under Co.	Five months, under lease.	Total.
Earnings	$1,866,556	$3,240,699	$5,107,255
Expenses	1,238,521	2,106,454	3,344,975
Net earnings	$628 035	$1,134,245	$1,762,280
Per cent. of expenses	66.35	62.00	65.49

Under the lease car-mileage balances and taxes are included by the lessee in its working expenses. Under the system of book keeping adopted by this company they were not so included, but placed among the charges on net income. In the statement above, the expenses for the five months under the lease are calculated on the basis of this company's system, and not on that of the lessee.

The earnings and expenses for the nine months, calculated on this basis, compare with the nine months of the previous year as follows:

	1883.	1882.	Inc. or Dec.	P. c.
Earnings	$5,107,255	$4,224,744	I. $882,511	20.9
Expenses	3,344,975	2,959,801	I. 385,174	13.0
Net earnings	$1,762,280	$1,264,943	I. $497,337	39.3
Gross earnings per mile	9,039	7,477	I. 1,562	20.9
Net " "	3,119	2,239	I. 880	39.3
Per cent of exps.	65.49	70.06	D. 4.57	...

Of the increase in gross earnings $121, 602 was during the four months under the company and $760,909 under the lease, the percentage of increase being 6.9 per cent. for the four months, and 30.7 per cent. for the five months under the lease.

The income account for the nine months, somewhat condensed, is as follows:

Net earnings, four months		$532,427.07
Income from rental, five months		1,132,731 93
Dividends, etc., received		29,137.88
Total		$1,694,296.88
Use of foreign cars, four months	$23,925.57	
Hire of car trust cars	195,259.59	
Rental of leased lines	305.469.52	
General expenses, taxes, etc	108,703.40	
Organization and agencies	23,352.68	
Contingent liabilities	15,000.00	
		671,710.76
Net income		$1,022,586.12
Interest on prior lien bonds	$360,000.00	
Special fund for additions	35.000 00	
Payment for experts	25,000.00	
		420,000.00
Balance		$602,586.12
Surplus from 1882		2,779.53
Advanced from income in 1882 on account of Bimrod Furnace judgment		84,922.73
Total applicable to first-mortgage bonds		$690,288.38
Dividend on first-mortgage coupon, No. 7, Jan. 1, 1884		648,586.37
Balance to 1884		$41,702.01

The amount expended for additions to property during the year was $27,852.15.

No statements of traffic are given in the report, but they will be duly presented in the next report.

The President's report says: "Under the lease the lessee undertakes to pay, out of its share of the gross earnings, all taxes on the premises during the term, but portions of the taxes, especially in the state of Ohio, have been for many years payable after the close of the year for which they are levied, and when this company received the property from the late Receiver there remained a large part of the taxes of 1879 unpaid and payable in 1880, and a large part of the taxes pertaining to the year 1882 were payable in June, 1883, and this company was liable for the taxes pertaining to the first four months of 1883. These last taxes are a charge upon the income of the company for the period to which this report applies and will appear in the next report as a portion of the taxes pertaining to the first four months of the year 1883, which are payable in December, 1883. The taxes for the period subsequent to April 30, 1884, are covered by the provisions of this lease.

"The delays which have occurred in the monthly statements of earnings under the lease have been the subject of great annoyance. They were caused by the very important changes in the system of accounts of the lessee required by certain peculiar provisions of the lease, especially those as to terminals allowed to each road, and as to the expenses incurred in and about the harbor of New York, which provisions were made solely for the reason that they were calculated to produce just results between the parties, but they have been found to involve an enormous amount of labor and detail in billings of freight, reports of agents, and in the accounting department generally, producing necessary delays which this board is satisfied that the lessee did everything in its power to overcome. Negotiations are now pending for modifications in the system of accounts in the two particulars above stated, intended to produce substantially the same equitable results, but at the same time greatly diminishing the difficulties of accounting and making prompt returns practicable.

"The board takes great pleasure in reporting the result of the operation of the road for the first five months of the lease.

"It will be noted from the tables furnished that there was an unprecedented increase in the traffic upon the road and in its earnings, gross as well as net, the increase amounting to 30.68 per cent. over the gross earnings for the same period in the year 1882, in which year the earnings for that period were much larger than during the same period in any previous year.

"The gross earnings for that period as reported by the lessee were $3,240,699, and at the rate of $7,777,677 per year, while the gross earnings for the same period in 1882 were $2,479,790, and at the rate of $5,951,496 per year.

"The increase of traffic was progressive from the first, becoming in August so large as to produce a gross earning of $753,665 for the month, being an increase of $225,285, or 42.63 per cent., over the earnings of the same month in 1882, involving an amount of traffic much larger than had been anticipated; so that the facilities of the road were overtaxed and proved inadequate for the transportation of all the freight offered, resulting in a blockade on a portion of the road. Improvements, consisting of some 6 miles of new sidings and other improvements, increasing the capacity of the road, were promptly undertaken and completed as rapidly as practicable, the cost of which represented capital in the accounts of the company, and the road is now believed to furnish facilities for a traffic larger than that offered in the month of August last, but the temporary blockade of the road was not without injurious effect upon the subsequent volume of traffic.

"The board takes great pleasure in reporting that the lessee has, as to the conduct of traffic, its development and increase, the maintenance of the leased property and the prompt payment of rentals, performed its obligations under the lease to the satisfaction of the lessor.

"By the terms of the lease the lessee is to retain 68 per cent. and pay the lessor 32 per cent. of the gross earnings for any year when they amount to $6,000,000 or less; but when the gross earnings exceed $6,000,000, the lessor is to receive 50 per cent. of the increase until the lessor receives 35 per cent. of the gross earnings of the year; that is, when the gross earnings for one year equal or exceed $7,200,000 the lessor receives 35 per cent. of the whole.

"In 1882 the gross earnings were $5,831,082 and the operating expense 65.82 per cent., as shown by this company's system of accounts, which did not include in the operating expenses taxes, car mileage balances and certain general expenses which are to be paid by the lessee under the lease and which if added to the operating expenses of 1882 would have made the operating expenses of that year 70.8 per cent. of the gross earnings, which per cent. must be taken when comparing the rental provided under the lease with the net earnings before the lease. In such a comparison we find the net earnings in 1882 to have been 29.2 per cent. on a gross earning of $5,831,082 (a little under $6,000,000), while under the lease the rental on the same gross income would be 32 per cent., giving this company a real increase of net earnings of 2.8 per cent. over the best result obtained by it during its operation of the road."

Lehigh Valley.

This company owns a line from Perth Amboy, N. J., to Wilkes-Barre, Pa., 161 miles, with numerous branches and spurs in the Lehigh coal region in Pennsylvania. The statement of track given in the report is as follows:

	Miles.
Main track, main line and branches	314.20
Second track	176.85
Second track laid, but used as sidings	13.95
Sidings	274.53
Total track	779.53

This is an increase during the year of 37.94 miles, caused by extension of second track and sidings, and building new sidings and branches.

The equipment consists of 313 locomotives; 102 passenger 49 baggage and express and 10 fruit express cars; 2,325 box, 300 lumber, 13 stock, 45 lime, 50 bark, 477 platform, 1,365 gondola, 150 tunnel, 26,378 coal and 88 caboose cars; 1 pay-car, 37 wreck and tool cars, 16 supply cars, 5 water cars, 290 gravel cars and 6 gravel train cabooses.

The increase during the year was 21 locomotives; 17 passenger, 4 baggage and 4 fruit cars; 367 box, 85 lumber, 1 lime, 4 platform, 230 gondola, 373 coal and 10 caboose cars; 7 wreck and tool cars and 6 gravel train cabooses.

The Vice-President's report gives the total coal tonnage for the year and for four preceding years as follows: 1883, anthracite, 6,527,512; bituminous, 64,724; total, 6,592,646; 1882, total, 6,336,141; 1881, total, 5,870,701; 1880, total, 4,672,724; 1879, total, 4,415,285 tons.

The income statement is as follows:

	1883.	1882.	Inc. or Dec	P. c.
Income from all sources, including investments, etc.	$11,310,172	$11,239,312	I. $70,860	0.6
Expenses of the road	6,175,656	5,833,677	I. 341,979	5.8
Net earnings	$5,134,516	$5,405,635	D. $271,119	5.0
Net earnings as above				$5,134,515.83
Interest on bonds, including guaranteed bonds		$2.031,674.72		
Dividends on preferred and common stock		2,210,378.00		
General expenses and interest, taxes, loss on Morris Canal, etc		421,920.21		
Amount charged for estimated accumulated depreciation		347,944.29		
				5,011,917.22
Balance to credit of profit and loss				$122,598.61

The report continues: "The operating expenses of the year have been increased by charging to these accounts a number of extraordinary expenditures, which, without apparently increasing the earning power of the road, will, however, affect its future economical maintenance.

"Our capital account at the close of the fiscal year, was as follows:

Preferred stock	$106,300	
Common stock	$27,496,850	
		$27,603,150
First mortgage, 6 per cent. bonds (coupon and registered) due in 1898		5,000,000
Second mortgage, 7 per cent. bonds, registered, due in 1910		6,000,000
Consolidated mortgage 6 per cent. bonds, due in 1923, except sterling bonds:		
Sterling	$3,854,000	
Coupon	1,949,000	
Registered	7,498,000	
Annuity	553,000	
		$13,854,000
Floating debt, less cash on hand	none.	
		$52,457,150

"One hundred and sixty-eight of the sterling bonds were drawn, payable Dec. 1, 1883, leaving $3,686,000 bearing interest from that date.

"The agreement with the Southern Central Railroad Co., of New York, mentioned in our last report, was duly consummated, and we also agreed to purchase from that company an additional amount of $300,000 of its first-mortgage 5 per cent. bonds, to enable it to make further improvements. This connection continues to be of great importance to us, affording as it does a direct communicotion with Lake Ontario, and enabling us to reach an area of distribution for coal which is constantly increasing.

"The earnings of the Geneva, Ithaca & Sayre Railroad Co. have been during the past year, for the first time since the formation of the company, sufficient to meet the running expenses and the interest upon the bonds of the Ithaca & Athens Railroad Co., one of its component parts. Considerable advances have, however, been needed to complete the substitution of steel rails upon its main line, and for other changes needed to bring the road into first-class condition. During the coming year it is intended to relay the Cayuga Branch of 38 miles with steel rails, and rebuild some of the bridges, after which we trust that company will be self-sustaining.

"The report of the Pennsylvania & New York Canal & Railroad Co. will show the operations of what is practically a part of our main line, but under a different organization. Although they have been as usual able to pay from their net earnings a dividend upon the preferred stock, in addition to the interest upon their bonds, yet the completion of their second track and their tunnel near Vosburg will continue to require large advances from us for some time to come.

"No increase has been made during the year in the number of our steam vessels on the Western lakes, but it may be necessary to greatly enlarge their capacity, by the purchase or construction of either more steamers or of tenders to those we now have, or of both. Although this will require a considerable increase in our investment, the result of that heretofore made would seem to warrant it.

"The improvements on the Tiffet Farm at Buffalo have been steadily progressing, and there is ample room for an expansion which may be required by the demand of future business. This plan, as adopted, contemplates a wharf frontage equal to almost eight linear miles, and will be carried out as needed.

"It being important for us to have an independent freight and passenger station in Buffalo a charter was obtained, under the laws of the state of New York, for a company called the Lehigh Valley Railway Co., and a location made from a point at Washington and Scott streets, near the centre of the business portion of that city, to Lancaster in Erie County, a distance of about 10 miles. Contracts have been made for ground for depot purposes, and for a portion of the right of way. This work will be pushed as rapidly as possible in the spring.

"Extensive improvements for the more expeditious and economical handling and shipment of our coal are being made at Perth Amboy, and a considerable expenditure of money will have to be made on this account.

"These various enterprises are solely in the interest of this company, and depend upon us for the capital required for their development.

"Since the last issue of stock, made at par among the stockholders in May, 1875, both the mileage of the company and its equipment have been increased more than 50 per cent., and large investments have been made, of great importance to our business, in Buffalo and at other places, as before referred to. To represent the capital so invested, and to meet other intended improvements and extensions, the board has directed the creation of an amount of common stock equal to 20 per cent. of the whole stock now outstanding, to be issued *pro rata* to the stockholders at par, payable in five installments, at intervals of three months. Interest at the rate of 5 per cent. to be allowed on payments, and the stock to be entitled to dividends declared after January, 1885."

The report refers in appropriate terms to the deaths of Mr. R. Asa Packer, a director of the company and President of the Pennsylvania & New York, and of Mr. Lloyd Chamberlain, for many years Treasurer of the company. Since it was issued Mr. Harry E. Packer, President of the company, has also died.

The anthracite coal traffic of the road was as follows:

	1883.	1882.	Increase.	P.c.
Tons coal carried	6,527,912	6,257,159	250,753	4.3
Coal ton-miles:				
Above Mauch Chunk	185,019,822	170,054,375	14,965,447	8.8
Below Mauch Chunk	339,438,077	320,356,405	19,071,672	5.9
Total	524,457,899	490,420,780	34,037,119	6.9

The chief points of distribution of this coal were as follows: Over New Jersey Division, 2,095,978 tons; to Belvidere Division, Pennsylvania Railroad, 1,371,871; to Pennsylvania & New York, 825,790; to Morris Canal, 300,697; to Perkiomen Railroad, 171,367; to North Pennsylvania road, 145,812 tons.

Of the total tonnage the Wyoming Region furnished 1,431,150 tons; Hazleton, 3,028,037; Upper Lehigh, 6; Beaver Meadow, 557,203; Mahanoy, 1,511,337; Mauch Chunk, 179 tons.

The traffic other than coal was as follows:

	1883.	1882.	Inc. or Dec.	P. c
Passengers carried	1,935,006	1,786,854	I. 148,152	8 3
Passenger-miles	31,801,917	27,449,347	I. 4,352,570	15.9
Tons freight carried	3,123,247	3,685,436	D. 562,189	15.3
Ton-miles	179,562,4?4	216,411,652	D. 36,849,228	17.0

The decrease in general freights was chiefly in pig-iron, iron ore and rails, and in petroleum.

The total tonnage carried, including both coal and general freights, was 9,701,159, the total traffic of all kinds amounting to 704,020,323 ton-miles against 706,832,433 ton-miles in 1882

The earnings for the year were as follows:

	Earnings.	Expenses.	Net earnings.
Coal	$7,401,796	$4,137,554	$3,264,242
Other freights	1,985,405	1,404,656	580,749
Pass's, express and mail.	830,949	633,446	197,503
Total	$10,218,150	$6,175,656	$4,042,494
Total, 1882	10,160,070	5,833,677	4,326,393
Inc. or dec.	I. $58,080	I. $341,979	$283,899
Per cent	0.6	5.8	6.6

The earnings last year were $32,542 gross and $12,874 net per mile of road. The expenses were 60 4 per cent. of gross earnings, against 57.4 per cent. in the preceding year.

The General Superintendent's report notes the renewal of several bridges on the New Jersey Division and of two west of Easton. The three-track iron bridge over the Lehigh at Mauch Chunk has been completed and the double-track iron bridge over the Lehigh at Onoko has been replaced by a new one. The abandoned North Branch Canal in Wilkesbarre is being filled up and will be used for additional tracks.

Several new stations have been built on the New Jersey Division and on the Mahanoy Division. A brick engine and boiler house and a lumber drying house have added to the shops at South Easton. A new engine house holding 29 engines has been built in the Packerton yard and a new car house at Mauch Chunk. Several additions have been made to the shops at Wilkesbarre and to those at Delano and Hazelton.

The telegraph lines have been extended and the company now has in use 810 miles of telegraph wires, 24 of telephone wires and 12½ of single wires.

Work has been continued through the year on the new trestle for storing coal at Perth Amboy, and these trestles now have a storage capacity of 132,000 tons. There still remained to be completed trestles with a further capacity of 104,000 tons. It has been necessary to expend a considerable amount in dredging at Perth Amboy in order to maintain the necessary depth of water at the company's docks.

The third track between Mauch Chunk and East Mauch Chunk is still in progress and will soon be completed, making a valuable improvement in that part of the line. The double track tunnel at Rockport, put under contract in 1882, is not yet completed, but the headings are through and work is progressing well. The grading and laying of second track to be used in connection with this has been extended to within half a mile of the east end of the tunnel and some gradiug has also been west of the tunnel.

The Glen Summit Land Co. is building a large hotel at that place which will be used as a dining station for the road and will also afford excellent accommodation for passengers who are obliged to stop. Water-works have been constructed to supply the hotel and also the railroad at that point.

RELIEF FUND.

The condition of the Employés Relief Fund is as follows:

Balance on hand Nov. 30, 1882	$7,568.97
Contributed by employés during the year	9,324.04
Contributed by our companies	9,324.04
Total	$26,217.05
Disbursements during the year	19,409.94
Balance on hand Nov. 30, 1883	$6,807.11

There were two calls made during the year, and the number of employés who contributed to the last call was 2,947.

LEHIGH VALLEY COAL CO.

The report of the General Superintendent of this company (which is owned by the Lehigh Valley Railroad Co.) is as follows:

"The following is a condensed report of the operations of the Lehigh Valley Coal Co., for the year ending Nov. 30, 1883, as compared with previous years:

	1883.	1882.	1881.
Amount of coal produced by collieries owned and operated by the company	1,551,196	1,397,710	1,508,720
Amount of coal shipped by tenants of the company and from lands controlled by it	1,645,505	1,633,203	1,160,819
Total shipments by this company and from property owned or controlled by it	3,196,701	3,030,913	2,669,539

"This statement shows an increase in 1883 over 1882 of 165,788 tons, or 5.47 per cent.

"The above tonnage was mainly transported to market by railroads owned or controlled by the Lehigh Valley Railroad Co., and the increase demonstrates the accuracy of the anticipation of an increased output in last report.

"Two new collieries are being erected, viz., Dorrance Shaft, at Wilkesbarre, and Packer, No. 5, at Lost Creek, from both of which shipments are expected during 1884. Existing collieries are all in good condition, and can fully meet any demand that the market may require.

"Arrangements have been made with the Trustees of the Girard Estate for the renewal of leases of the Packer collieries for a period of 15 years."

Pennsylvania & New York.

This company, which is controlled by the Lehigh Valley Co., owns a line from Wilkesbarre, Pa., to Waverley, N. Y., 104 miles, with 23 miles of branches. The report, which is for the year ending Nov. 30 last, says:

"The total length of track now laid and in use in main line, sidings and branches, belonging to this company is 295.87 miles, an increase of 30.34 miles, laid during the year. The following is a classification and mileage of our track:

Main Line, Wilkesbarre to New York state line	104.30
Second track, in use as such	72.79
Sidings and second track used as sidings	75.06
Waverley & State Line R. R. and sidings	2.48
Branch and sidings, connected with the G. I. & S. R. R.	5.74
" " " " Southern Cent. R. R.	4.82
Branch and sidings, connected with Barclay R. R	3.07
Branch and sidings, connected with N. Y., Lack & W. R. R	0.27
Sidings at Waverley	0.39
" " Elmira	0.68
" " Sayre shops and round-house	3.37
Pleasant Valley Branch and sidings	8.50
West Pittston Branch and sidings	7.69
Branch and sidings to coal breakers	6.71
Total miles of track	295.87

"Included in above mileage is 36.90 miles of main track and sidings between L. & B. junction and Wilkesbarre.

"We have now in use in our main tracks and branches 225.89 miles of steel rails, an increase of 44.36 miles during the year, and our tracks have been maintained in good condition."

The equipment consists of 79 locomotives; 631 box, 45 stock, 210 gondola, 120 flat, 4,151 coal and 32 caboose cars; 5 derrick and wreck cars, 88 gravel cars and 9 shop trucks. The passenger equipment used is furnished by the Lehigh Valley Co.

No general balance sheet is given in the report. The company has $1,061,700 common stock, $4,000,000 preferred stock and $3,000,000 first-mortgage bonds.

The coal transportation, which is the most important business of the road, was as follows:

Tons moved:	1883.	1882.	Inc. or Dec.	P.c.
Anthracite	1,292,785	1,078,967	I. 185,818	17.3
Bituminous	308,566	371,005	D. 32,439	8.7
Total	1,601,351	1,447,972	I. 153,379	10.6
Ton-miles:				
Anthracite	109,342,485	92,975,205	I. 16,367,280	11.1
Bituminous	9,034,608	10,166,471	D. 1,131,863	14.8
Total	118,377,093	103,141,676	I. 15,235,417	11.1

Of the anthracite coal moved 825,790 tons were received from the Lehigh Valley road. The report says: "We have hauled over the New York, Lake Erie & Western Railroad, during the year with our own engines, from Waverly to Buffalo and intermediate points. 262,054 tons

"The amount of anthracite coal transported in box cars during the year was 238,140 tons, a decrease of 39,949, or 14.37 per cent. The amount so carried was 18.86 per cent. of our anthracite tonnage."

The passenger traffic and the general freight business, exclusive of coal, was as follows:

	1883.	1882.	Inc. or Dec.	P.c.
Passengers carried	269,658	240,336	I. 29,322	12 2
Passenger-miles	9,011,380	8,016,694	I. 994,686	12.4
Tons freight carried	950 516	1,080,168	D. 129,652	12.0
Ton-miles	78,269,897	90,593,344	D. 12,323,447	13.6
Av. rate:				
Per passenger-mile	2.55 cts.	2.56 cts.	D. 0.01 cts.	0.4
Per ton-mile	0.92 "	0.82 "	I. 0.10 "	12.2

The total tonnage carried over the road last year, including general freights and coal, was 2,551,867 tons, and the ton-mileage was 196,646,989. Of the passengers carried 48,016 were through.

The earnings for the year were as follows:

	1883.	1882.	Inc. or Dec.	P.c.
Coal	$1,340,134	$1,343,306	D. $3,172	0.2
Freight	715,850	743,400	D. 27,550	3.7
Passenger, mail and express	213,566	200.522	I. 13,044	6.5
Miscellaneous	47,297	16,316	I. 30,981	100.1
Total	$2,316,847	$2,303,544	I. $13,303	0 6
Expenses	1,355,026	1,260,143	I. 94,883	7.5
Net earnings	$961,821	$1,043,401	D. $81,580	7.8
Gross earn. per mile.	18,243	18,448	D. 205	1.1
Net " "	7,573	8,415	D. 842	10.0
Per cent. of exps	58.48	54.70	I. 3.78	....

During the year 8 passenger and 9 heavy freight engines were added to the equipment, and two more are to be received. One old engine was broken up and one sold to the Buffalo Creek Railroad Co. The car equipment was increased by 10 coal and 30 gravel cars, and one wrecking car is building in the company's shops.

The double track has been extended from the north a short distance below Wyalusing, and from the south to a point three miles below Tunkhannock. This leaves 29.89 miles between the north and south end of the double track, of which 22 miles is already laid and nearly ready for use. The grading of the balance is done except one mile, and a double track will be completed in the spring over the whole of the road. The West Pittston Branch was extended about 3 miles, and a spur put into a new breaker of the Butler Colliery Co. The company's yard in Buffalo has been extended by the laying of about 3 miles of sidings. The tunnel through the mountain at Vosburg was commenced in April last, and up to the close of the year the heading has been driven 702 ft. on the west end and 709 ft. on the east end. The new yard at Coxton is finished, and work there is now done with better dispatch than formerly. Bridges are reported in good coodition, and no work has been done during the year, except to renew some ties. The new round-house at Sayre has been completed, and work begun on a new foundry and carshop there.

The Vice-President's report notices appropriately the death of Mr. R. Asa Packer, formerly President of the company, and says:

"The above net earnings will, after providing for state and other taxes, interest on bonds, interest on floating debt, etc., enable the directors to declare a dividend of 10 per cent. to apply to the arrearages on the preferred stock.

"We have expended during the year for construction and equipment accounts, the sum of $844,560 for the building of additional double track, the purchase of 19 new locomotives, improvements at Coxton, etc.

"An important decision, which was afterward affirmed by the Supreme Court, was secured by us during the year in the Dauphin County Court. By it the tax laws of 1879 and 1881, which had been construed as applying to the bonds of this company, were determined to be inoperative so far as we were concerned, and we are thus freed under existing laws from deducting any state tax from our bondholders.

"The extensive and valuable timber tracts on the west side of the Susquehanna River above Wilkes-Barre offer considerable inducement for the building of a branch road in order to obtain the freight that would necessarily come over it. Several surveys have been made into that region, and the advisability of commencing early operations has been seriously considered. Nothing as yet has been done, but we are prepared to move at once when a conclusion has been reached.

"The branch connected with our road by the bridge recently built by us across the Susquehanna River, at Coxton, is about completed, and we are now receiving on our own tracks the coal from our collieries in that region. This, added to the tonnage we are likely to secure from other operations, fully justifies the investment, which must necessarily be profitable from its commencement.

"The improvements at Coxton, for the better handling of our coal trains, are about finished, and the increased efficiency resulting from this change will at once place us in a position to accommodate a large tonnage with greater ease and economy."

Delaware & Hudson Canal Co.

This company publishes the following summary of its income account for the year ending Dec. 31, in advance of the completion of their full report:

	1883.	1882.	Increase.	P.c.
Receipts from coal	$9,827,874	$9,141,189	$686,485	7.5
Receipts from railroads	7,417,643	5,935,670	1,481,973	25.0
Receipts from miscellaneous and interest	596,982	496,868	100,114	20.1
Total receipts	$17,842,499	$15,573,927	$2,268.572	14.6
Expenses	12,456,174	10,422,325	2,033,849	19.5
Net earnings	$5,386,325	$5,151,602	$234.723	4.5
Interest and rentals	3,390,482	3,313,401	77,081	2.3
Balance	$1,995,843	$1,838,201	$157,642	8.6

The surplus earnings last year were equal to 9.98 per cent. upon the stock against 9.20 per cent. in the previous year.